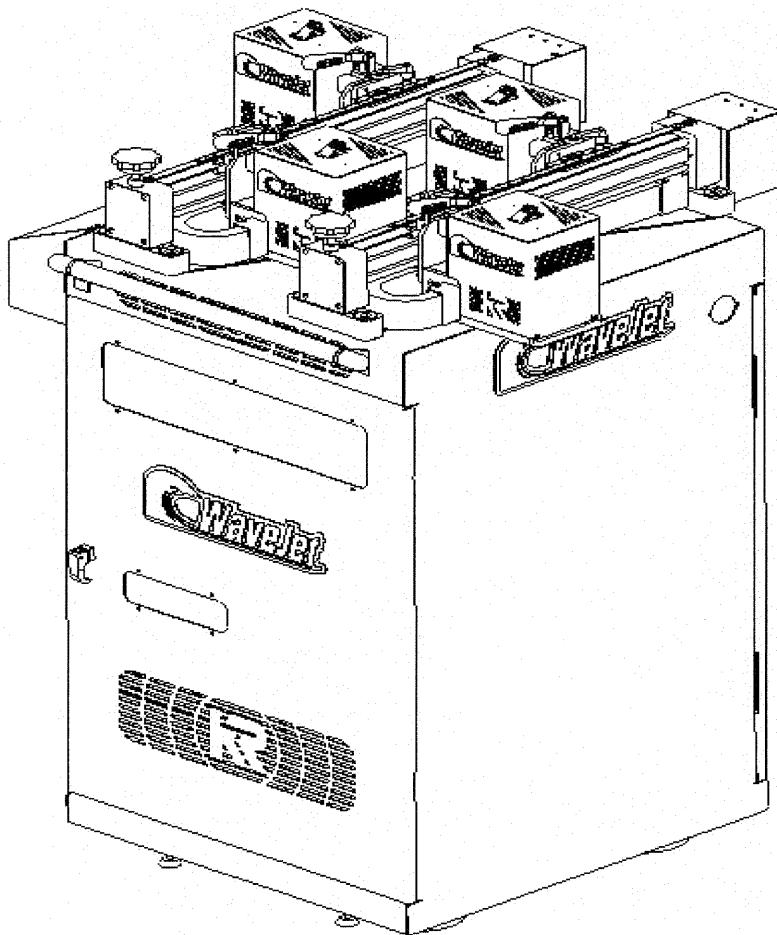


Kirk-Rudy, Inc.

WaveJet Print System

Product and Software

Users Guide



WaveJet

Manufactured by Kirk-Rudy, Inc.

Before using this machine, all operators must study this manual to understand and follow the safety warnings and instructions. Keep these instructions with the machine for future reference. If you have any questions, contact your local Kirk-Rudy, Inc. Distributor.

6/01/2005

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1.0 IMPORTANT SAFETY INFORMATION

Intended Use Statement: Kirk-Rudy's WaveJet Addressing System is designed for printing addresses, graphics or other text onto paper products using Kirk-Rudy approved inks. Using the product for other purposes or using non-approved inks may lead to an unsafe condition.

1.1 Definitions

The following statements are found throughout this manual.

Warning

Operating procedures, techniques, etc. that could result in personal injury or loss of life if not carefully followed.

Caution

Operating procedures, techniques, etc. that could result in equipment damage if not carefully followed.

Note

Operating procedures, techniques, etc. that are considered very important.

1.2 General Safety Instructions

SAVE THESE INSTRUCTIONS. Read all instructions before using this product.



WARNING

- * NEVER OPERATE THE MACHINE WITHOUT ALL GUARDS OR SAFETY DEVICES IN PLACE.
- * ALWAYS TURN POWER OFF WHEN MAKING ADJUSTMENTS.
- * ALWAYS DISCONNECT THE POWER SUPPLY BEFORE STARTING ANY MAINTENANCE OR SERVICE WORK.
- * NEVER START THE MACHINE WITHOUT FIRST CHECKING ALL PERSONNEL ARE CLEAR OF MOVING PARTS.
- * KEEP FINGERS CLEAR OF ALL MOVING PARTS.
- * NEVER REMOVE THE PRODUCT FROM THE MACHINE WHILE MACHINE IS RUNNING.

- * SHOULD MISFED PRODUCT JAM THE MACHINE AND STOP IT FROM RUNNING, ALWAYS PRESS THE STOP BUTTON BEFORE CLEARING PRODUCT. IF THE STOP BUTTON IS NOT PRESSED AND THE JAM IS CLEARED, THE MACHINE WILL BEGIN RUNNING.
- * IT IS NOT RECOMMENDED THAT LOOSE CLOTHING, JEWELRY AND LONG HAIR BE WORN WHILE OPERATING THIS MACHINERY.
- * ALWAYS USE AN EXPERIENCED ELECTRICIAN WHEN TROUBLE-SHOOTING ELECTRICAL PROBLEMS.
- * REVIEW MATERIAL SAFETY DATA SHEETS PRIOR TO USING THIS PRODUCT
- * CHANGES OR MODIFICATIONS TO THIS UNIT NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

1.3 Ink Safety

Refer to Material Safety Data Sheet (MSDS) for detailed information regarding proper handling, use and storage of WaveJet ink.

PZ2100-605 Black Safety Supplement

Although water based inks work very well in the HP & Epson desktop printers, the performance requirements for direct mail printing are very different. The dry time, adhesion to substrate and other requirements are not achievable with the traditional water based inks, which are similar to inks (such as fountain pen inks), which have been in consumers' hands for many years.

Inks such as the PZ2100-605 are designed for industrial printers in industrial/commercial settings. The performance is achieved by using organic solvents and components, which are soluble in those solvents. A reading of the Material Safety Data Sheets by someone not used to interpreting them can give the impression that these inks are dangerous and to be avoided. However, consumers are exposed to similar chemicals in their homes and offices daily and have learned how to use them safely. The same is true for inks such as PZ2100-605.

OSHA states that workers have a right to know the risks to which they are exposed by hazardous chemicals in the workplace. The Material Safety Data Sheet is a device to provide that information. OSHA defines hazardous chemicals as those, which present a physical hazard (flammable, explosive, etc.) or a health hazard (toxic, irritant, carcinogen, etc.).

Health hazards can present a chronic hazard (including carcinogens, sensitizers, and those which can target specific organs) or an acute or immediate hazard such as toxic (poisonous) effect or a skin or eye irritant.

Some of the chemicals in PZ2100 are health hazards, specifically because they are eye irritants and because long-term exposure to high levels of the vapor resulted in kidney or liver damage in laboratory animals. However, rubbing alcohol, which can be found in the medicine cabinet in many homes, is an eye irritant, and ethanol (as in liquor) has a target organ (liver) effect from overexposure. The ingredients are NOT however toxic, which is a poisonous fatal effect on test animals by the OSHA definition. Common sense message: the inks are not to be splashed in the eyes or inhaled or ingested.

PZ2100 presents a physical hazard as defined by OSHA because it is flammable. Its flash point, or the temperature at which the liquid must be heated for its vapors to ignite determines the flammability of a liquid. Gasoline has a flash point below room temperature and hence is very flammable whereas kerosene has a higher flash point. PZ2100 has flash point similar to turpentine, but higher (that is, less flammable) than the rubbing alcohol in the medicine chest or the vanilla extract in the kitchen. Common sense is to treat it respectfully and not store it next to a radiator or heat source, not to smoke when using it, etc. Recommendations for storage are included in the MSDS.

1.4 Electrical Safety

General

WaveJet's electronics are housed in an enclosed, electrically grounded chassis and when properly installed, do not present electrical or thermal hazards. However, hazardous voltages and temperatures are present within the enclosure, its cables, connectors and accompanying print heads.

Print Head

Hazardous voltages and temperatures are required for print head operation. The piezoelectric (PZT) drivers in the jetting assemblies are activated by an electrical fire pulse of approximately 100 volts DC. The PZT drivers are electrically isolated from the exposed, electrically conductive carbon and aluminum outer surfaces of the print head. A print head cover has been provided to prevent inadvertent contact with high voltage components. Under no circumstances should the print head be operated without its cover in place.

Heater cartridges within the jetting assembly are supplied with 110 VAC. They are two wire devices and do not have a third wire ground lead. To comply with IEC standards, the print head is grounded and should remain so at all times.

1.5 Thermal Safety

Kirk-Rudy's WaveJet print heads have been designed to eliminate potential safety hazards in the event of a runaway jetting assembly heater. A thermal fuse mounted directly to the print head will remove power should its temperature exceed approximately 50 degrees C. During some failure modes, the print head could exceed 145 C. Indefinitely maintained operation of the heater at maximum specified voltage will not cause flame or molten matter to escape the print head but may release smoke with an undetermined toxicity. Never operate the print head without a properly functioning thermal fuse.

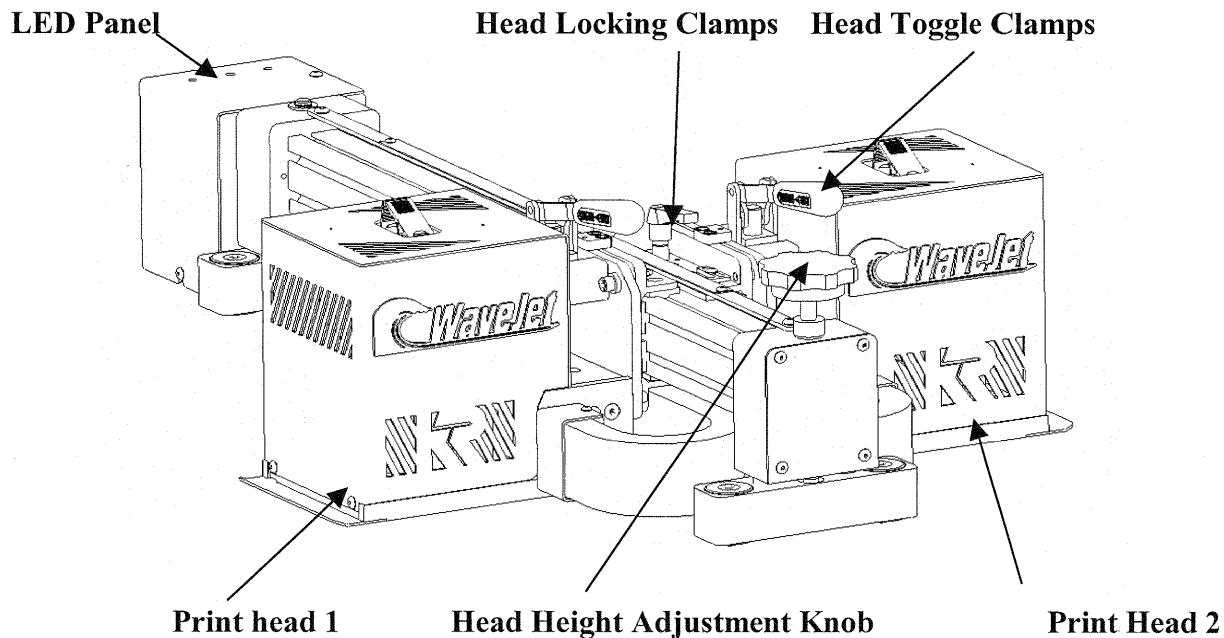
2.0 SYSTEM OVERVIEW

Kirk-Rudy's WaveJet Addressing System is a complete system for printing fixed and variable text, graphics and barcodes onto a wide variety of media. Once the system is started, users are able to connect to a data source, design a layout and begin printing. Electronic and pneumatic hardware is mounted inside a stand-alone cabinet. Cables and hoses connect the print head to the systems inside the cabinet. A Windows based user-interface provides control over the entire system.

2.1 Print Heads and Mount

The **Print Head** is a high performance drop-on-demand industrial inkjet print system. Ink droplets are formed using piezoelectric elements (PZT) contained within the print head.

Each **Print Head Mount** can hold up to 2 Print Heads and is bolted to the Base. The Print Mount contains all of the cabling, which is fed directly from the Electronics Enclosure.



Head Height Adjustment Knob – Turn this knob to raise or lower the entire mounting assembly. Generally speaking, the closer the print head is to the piece, the better the print quality.

Head Toggle Clamp – Raises the print head providing clearance to view or wipe the nozzle plate.

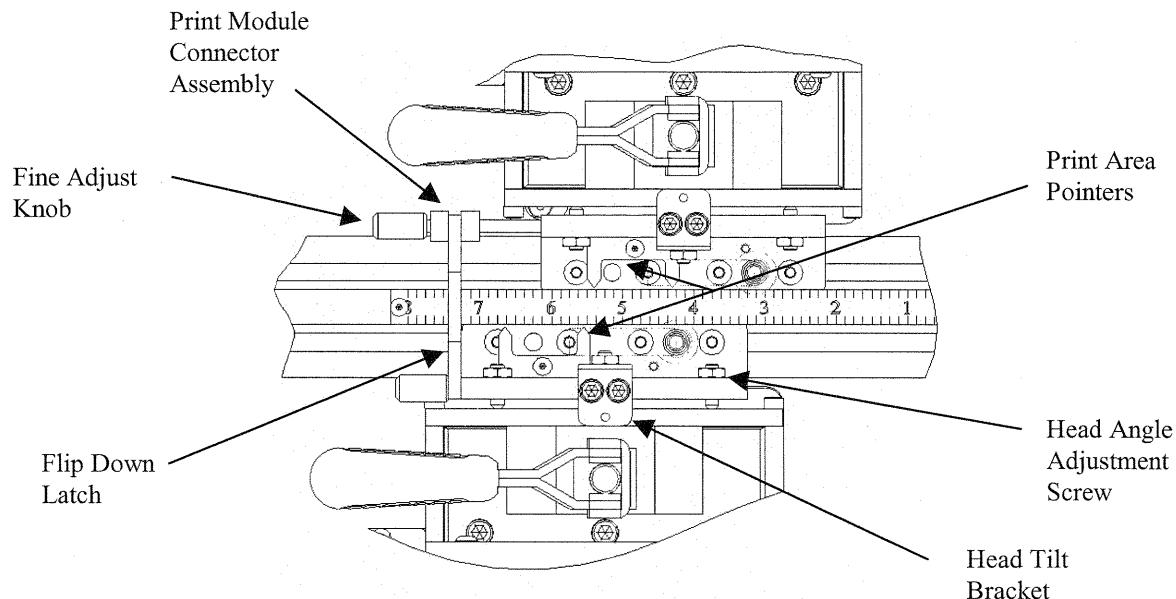
Head Locking Clamp – Loosen this clamp to slide the print head along the cross bar. Tighten the clamp to square the bottom of the print head to the tabletop.

LED Panel – Three LED's are mounted to the backside of the mounting assembly. They are provided to assist in trouble shooting problems. Each is labeled according to its function

Product sensor LED – Illuminates when the product sensor is blocked. Use it to check product sensor function.

Early Product sensor LED – Illuminates when product spacing is inadequate. The system is designed to print on one piece at a time. If the product sensor detects a piece while the print head is printing on the previous piece, the LED will illuminate.

Encoder LED – Illuminates whenever the system receives an encoder signal.



Close Up of Print Head Mount Scale Area

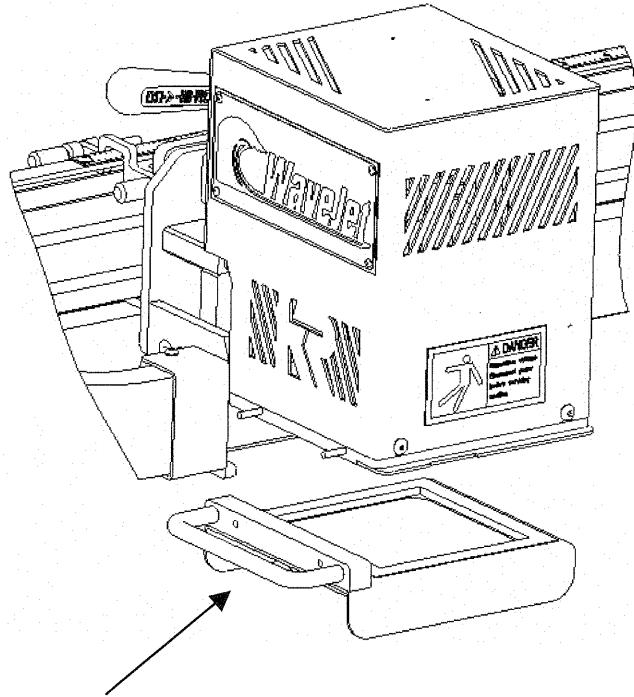
Print Module Connector Assembly: Join two print heads together and move them as a single unit using the Module Connector Assembly. Align the two modules using the **Fine Adjust Knob**. A **flip down latch** engages or disengages the two modules.

Print Area Pointer: The space between the two points of the Print Area Pointer represents the actual print area.

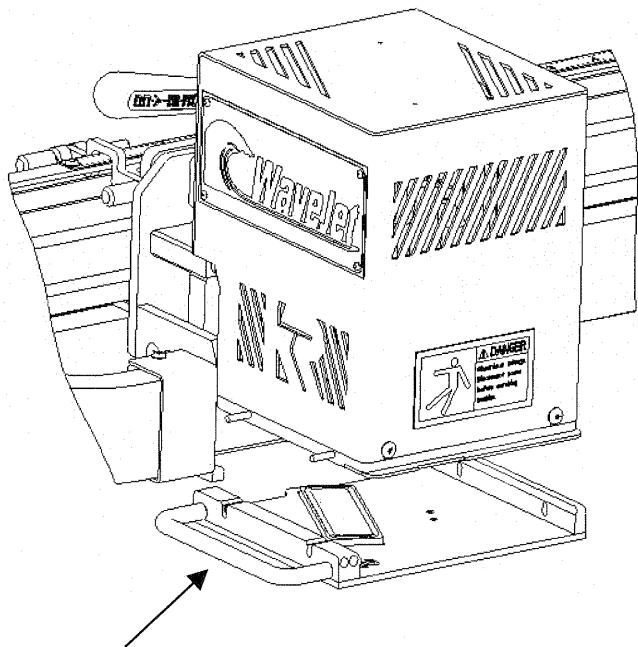
Flip Down Latch – This bracket joins two print head modules together. Connecting modules fixes the distance between their printed areas. Use the **Fine Adjust Knob** to change the position of one print area to the other.

Head Angle Adjustment Screw: Use this screw to change the head angle. The head angle is set at the factory and should not require field adjustments.

Head Tilt Bracket: Use the Head Tilt Bracket to make the print head nozzle plate parallel to the tabletop. The print head mounting bracket is set parallel to the tabletop at the factory however it may need adjustment during initial setup.

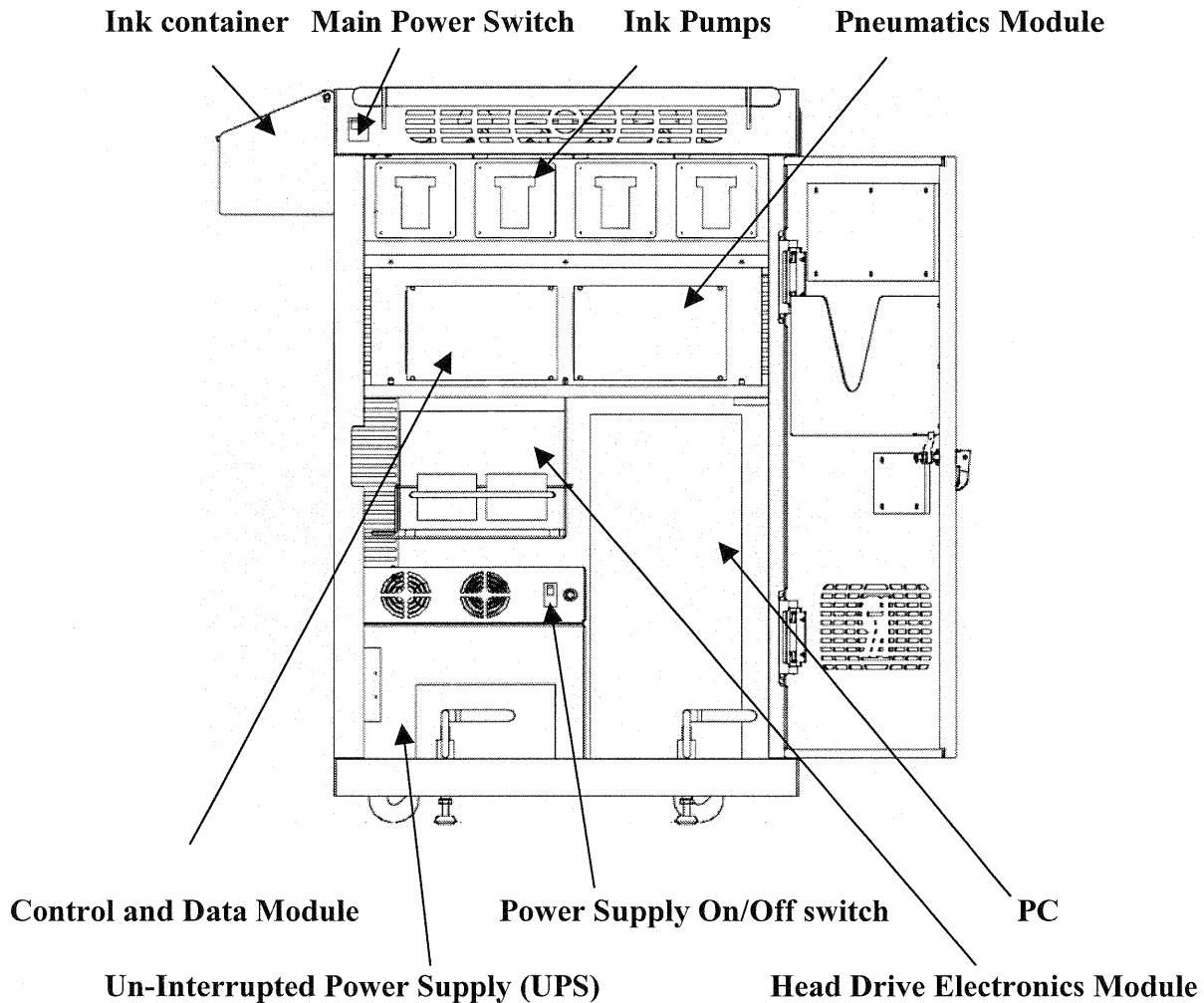


Ink Catch Tray – Captures ink expelled from the print head during a purge.



Nozzle Cap Tray – The nozzle tray provides a way to cap the nozzles keeping ink from drying out inside the print head. A rubber gasket attached to the cap bar forms a seal around the nozzles when the tray is attached to the print head assembly.

2.2 Electronic Enclosure



Main Power Switch – Applies main power to the power supply and UPS.

Ink Container – Up to four 500 ml Ink Bags (one per print head) are contained in this easy to use Ink supply system.

Ink pump – Ink is pumped to the print head using a peristaltic pump. This type pump works by rotating an assembly of rollers against the outside of a flexible tube.

POWER SUPPLY - Produces all the required voltages for the WaveJet system.

PC – Runs the user interface program and image processing software.

UPS – A battery that provides power to the PC so the operator has an opportunity to shut the PC down in a normal fashion after a power failure.

Head drive electronics module (HDEM) – A high voltage DC pulse generator that actuates the piezoelectric elements in the print head. High voltage is sent to the print head every encoder pulse. Gate arrays on the print head allow the signal to pass to the PZT material when a drop of ink is required. LED's on the front panel indicate HDEM status.

Control and Data Module – Performs two functions: 1. Monitors and controls print head temperature and ink-level sensor. 2. Manages image data as it is sent to the print head.

Pneumatics Module – Produces, monitors and regulates the air pressure and vacuum needed for up to (4) print heads. Each print head requires two separate vacuums and one positive pressure source. The positive pressure source arrives via one of the vacuum lines, so there are only two connections per print head. A description of each vacuum/pressure component follows.

Meniscus Vacuum - The meniscus vacuum is a small negative pressure (measured in inches of water) applied to the air volume above the ink in the ink reservoir. It counteracts the force of gravity on the ink in the print head, thereby preventing ink from “weeping” out of the print head nozzles. It also produces the correct concave meniscus shape at the air-ink interfaces in the nozzles. Under normal operation, meniscus vacuum will be maintained at all times except during a print head purge.

The meniscus line has two filters in series that prevent contaminants from entering the pneumatics module and print head. The pre-filter is located in the electronics enclosure and can be replaced when necessary. The filter mounted to the print head is a permanent filter and should not be replaced.

Lung Vacuum - The Lung Vacuum is a strong negative pressure (measured in Inches of Mercury) applied to the degassing membrane in the ink reservoir. The lung mechanism removes dissolved air from the jetting fluid, eliminating air bubble formation within the pumping chamber. Under normal operation, the lung vacuum will be maintained at all times. The lung line has a single filter to prevent contaminants from entering the pneumatics module.

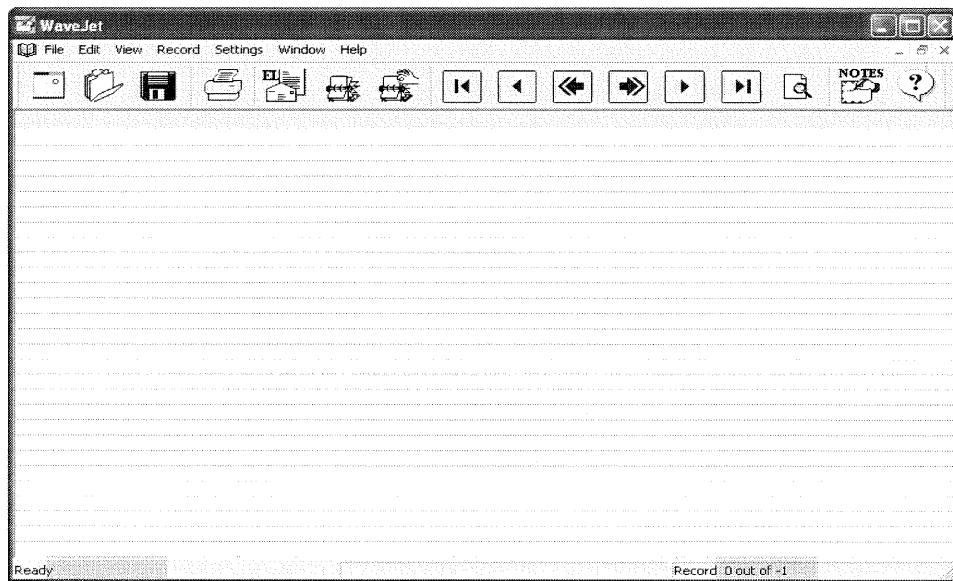
Purge – A purge is when air pressure (measured in pounds per square inch) is applied to the jetting fluid in the ink reservoir. During a purge, positive air pressure arrives to the selected print head via the meniscus vacuum line. Invoking a purge will force set quantities of jetting fluid to be expelled from the print head nozzles. This is used to clear minor clogs or air bubbles. The purpose is primarily to re-wet the nozzles, and to re-establish proper meniscus shape.

3.0 GETTING STARTED

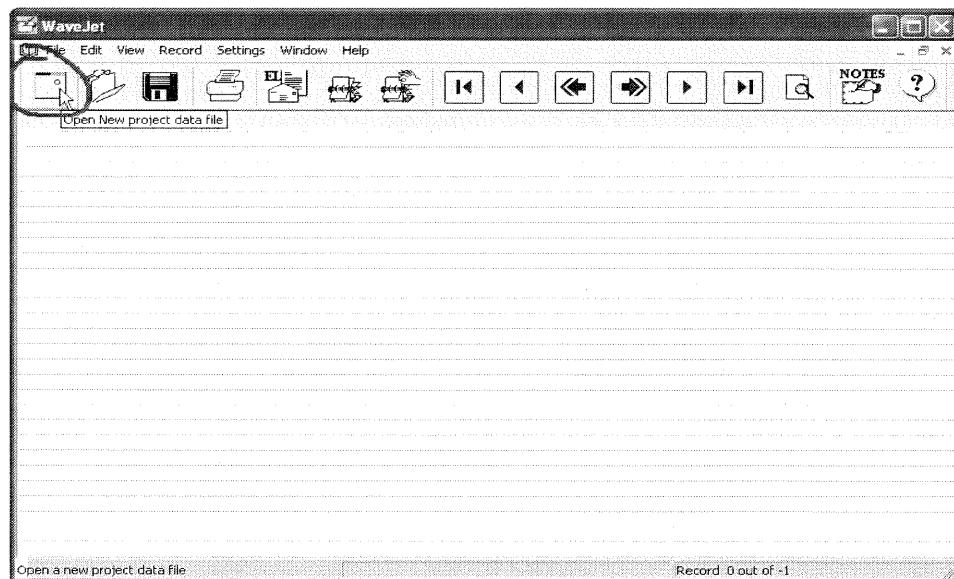
Before proceeding, the WaveJet System must be installed and setup by an authorized Kirk Rudy distributor. The following procedures assume that the system has been setup properly and Ink bags have been installed, etc.

3.1 Power and Initialize System

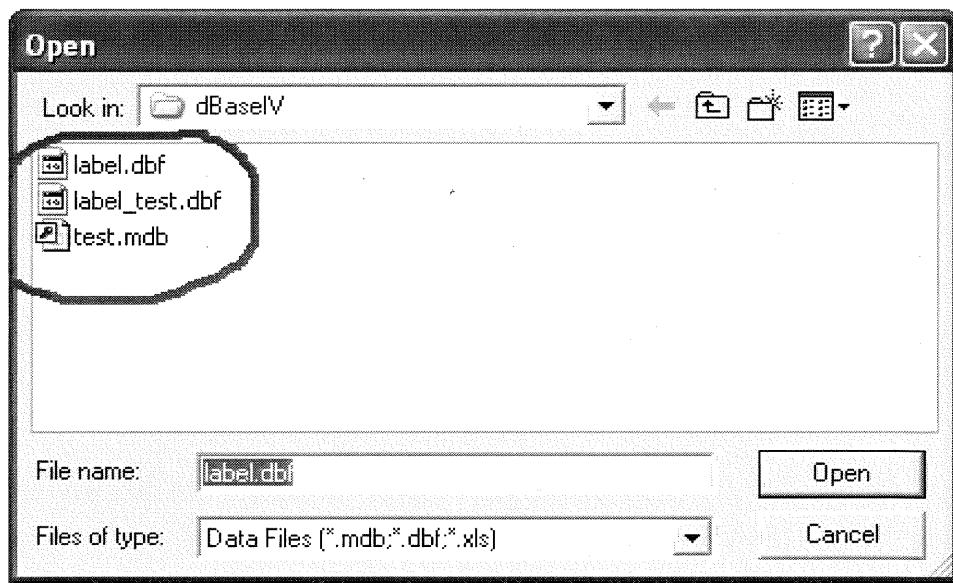
1. Turn the electronics enclosure power on.
2. Start up the PC and monitor
3. Double click the **WaveJet icon** on the PC desktop to display the following screen.



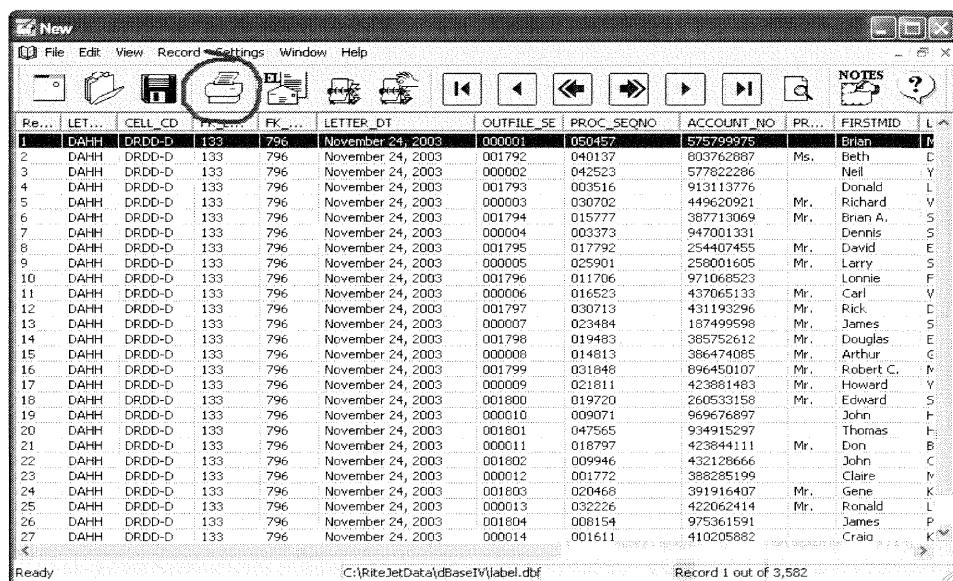
4. Select the **Open new project data file** icon



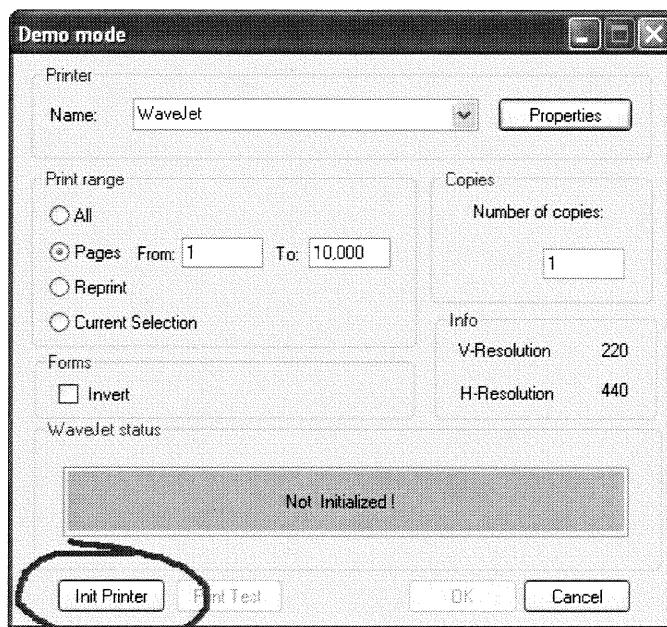
5. Select a **Data Source** that you want to print from.



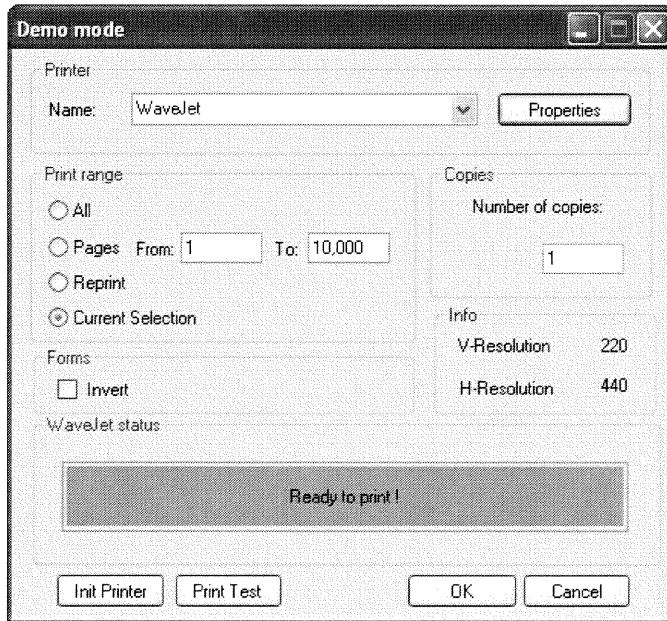
6. Select the **Printer Icon** to display the printer properties window.



7. Select the **Init Printer** button to initialize the printer. The system takes about 30 seconds to initialize.

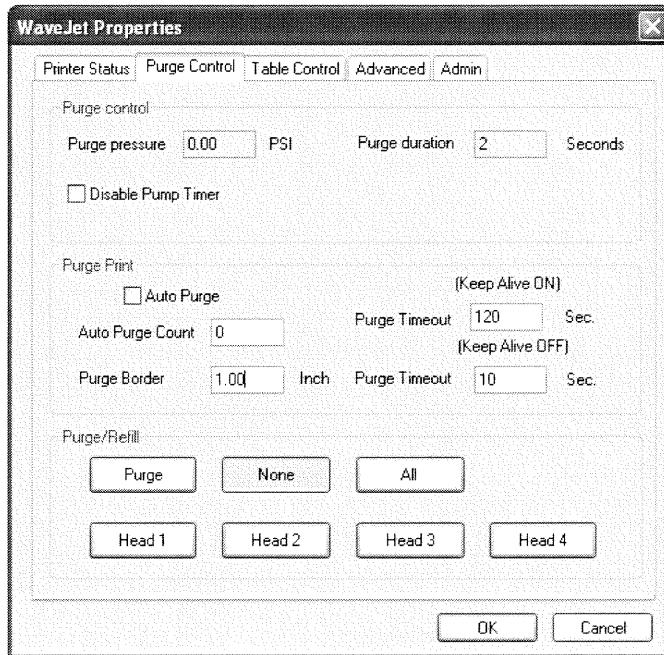


8: The WaveJet status window should change from red to green indicating the system is ready to print.



3.2 Purging and Cleaning the Print Heads

Purging and cleaning of the print heads should be performed once a day before starting print jobs. Under normal conditions, cleaning of the nozzle plates followed by two purges is sufficient to ready the system for printing.



1. Raise the print heads using the head toggle clamp and remove the capping trays. Spay a generous amount of solvent on to a wipe and clean the nozzle plates of each print head as per the procedure below. Place ink trays under all of the print heads.
2. Select **Properties** than select the **Purge Control** tab. Select “All” and click on the **Purge** button once. Verify that Ink has been purged out of the print heads.
3. Wait approximately 3 minutes and perform another short purge. Spray a generous amount of solvent on to a wipe and immediately clean the nozzle plates on all print heads using the following procedure:

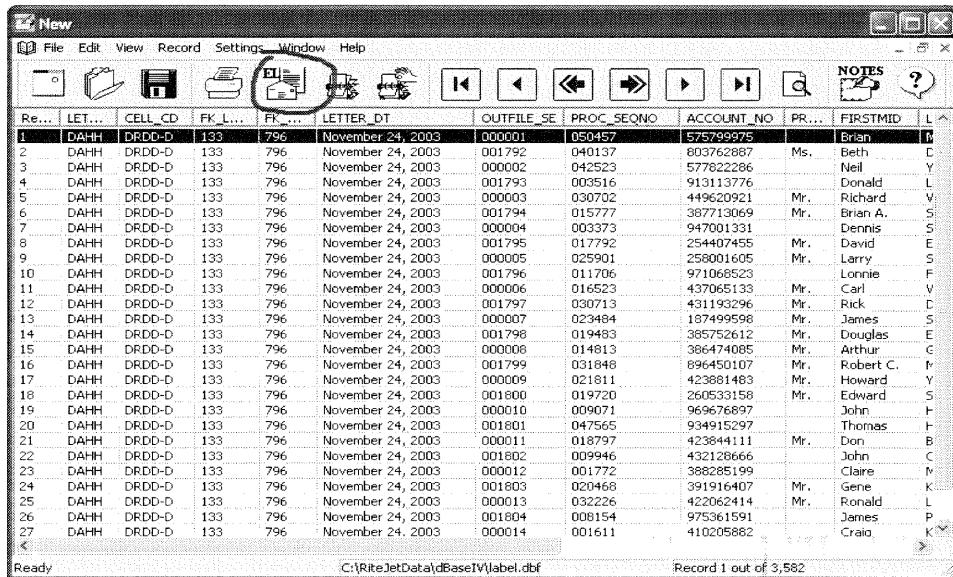
Nozzle Plate Cleaning

It is very important that the material used for a face-wipe be of a nonabrasive, non-particle or fiber shedding material such as **Kirk-Rudy PN 191159**. It is important that the wiping material be clean, non-woven, non-fibrous, non-shedding, and hasn't been left in an area exposed to air-borne dust and dirt, or other sources of contamination. Oils, and in particular, silicone oils, must not be wiped onto the faceplate.

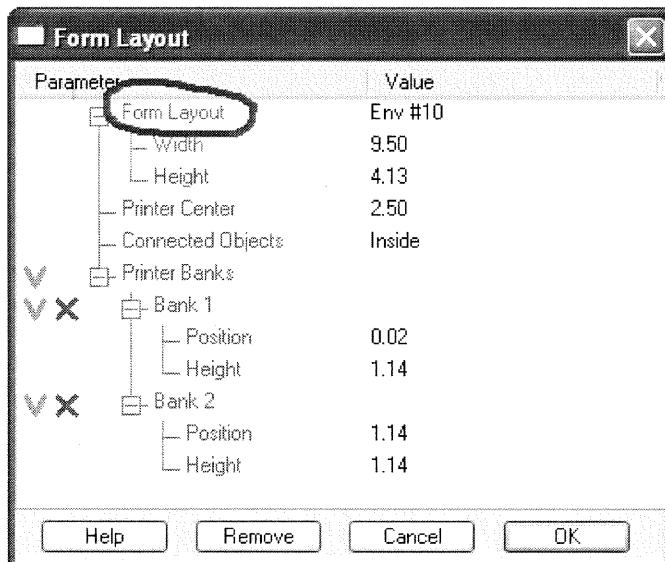
When it is necessary to perform a wipe across the nozzles, the preferred procedure is to wipe the nozzles in the “cross process” direction, so that if some debris is collected by the wipe, the debris are not then dragged across the rest of the jets. Wipe in a single, straight (not circular) motion.

3.3 Creating a Layout

1. Select the **Edit Layout** Icon to open the layout screen.



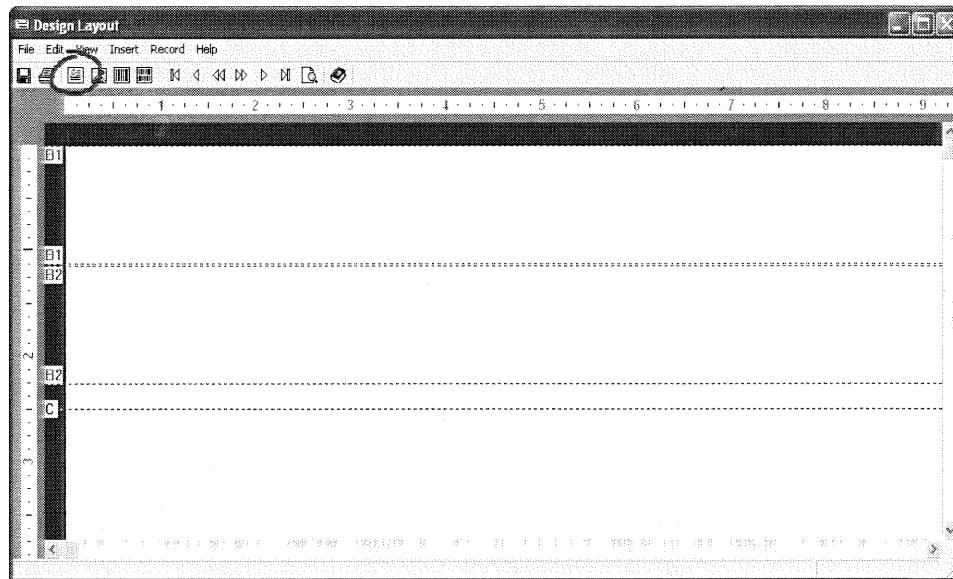
2. Select **Edit** and than select **Change form layout** to open the form layout window
3. Select **Form Layout** and a drop down menu will allow you to select the appropriate size media.



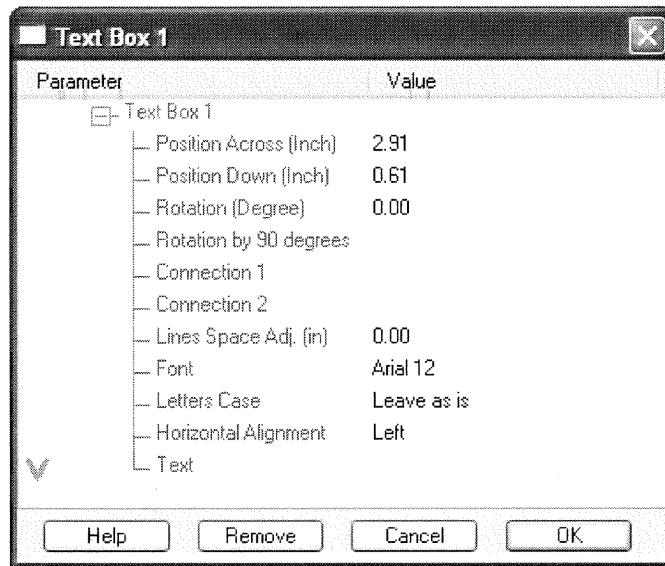
4. Once the form size is selected, the next step is to create text, barcodes and bitmaps on the layout.

3.3.1 Adding Text to a Layout

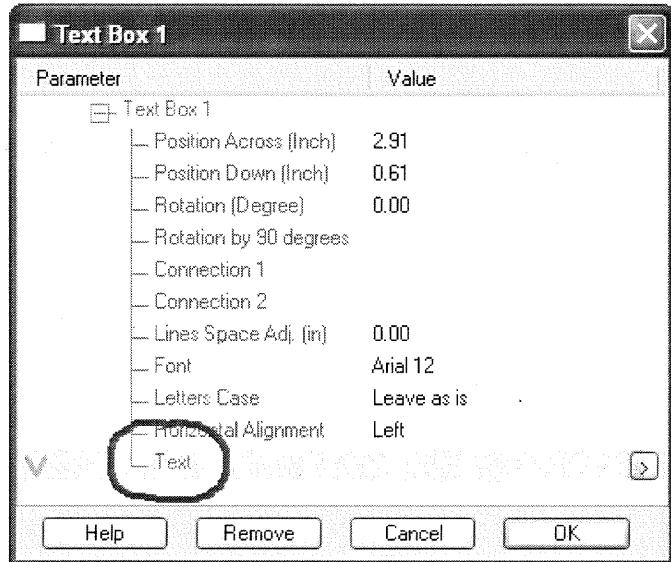
1. Left click on the **create text box** icon and position the text inside area B1 through B4 on the layout. (B1 = Print Head1, B2 = Print Head 2, etc.)



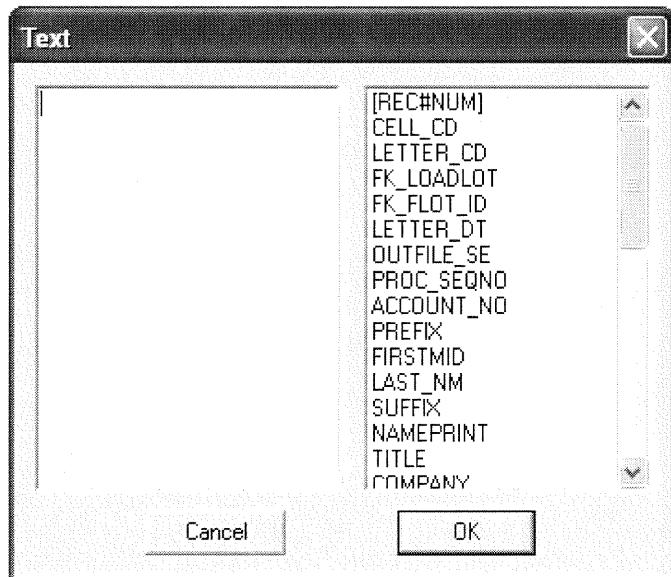
2. Once the text is positioned a text box menu will appear.

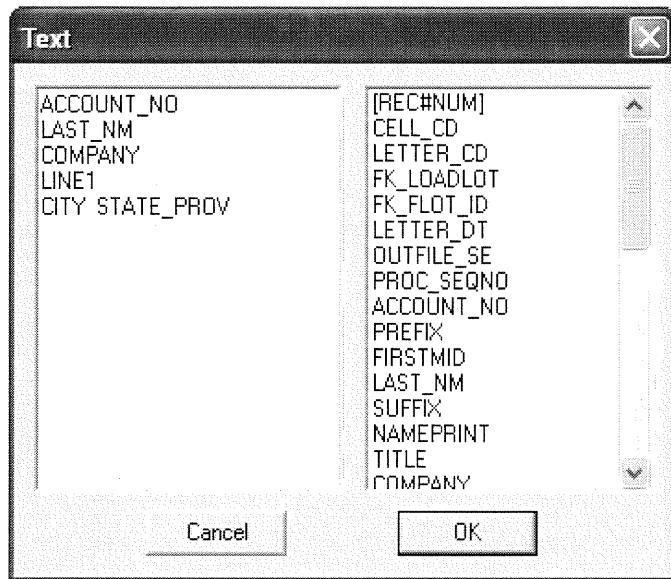


3. Select **text** and click on the **arrow** to bring up the text window:

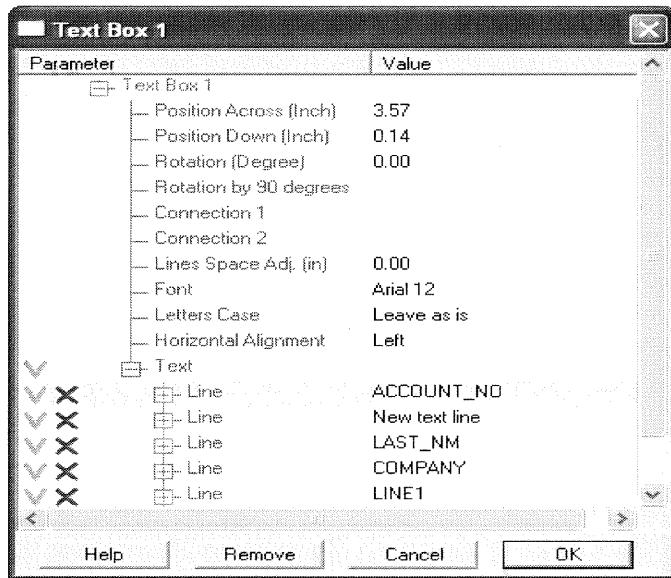


4. This window allows you to select fields from the right column by double clicking on them.





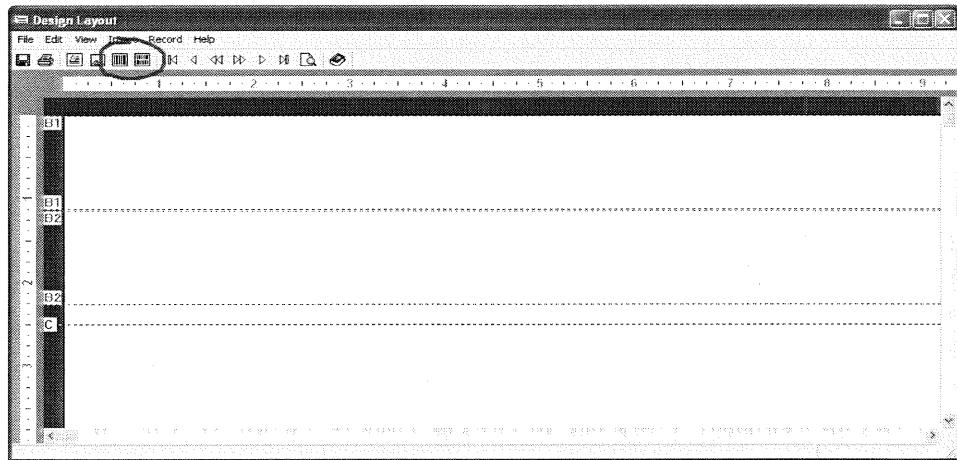
5. After selecting the desired **fields**, click **OK** to return to the Text Box window:



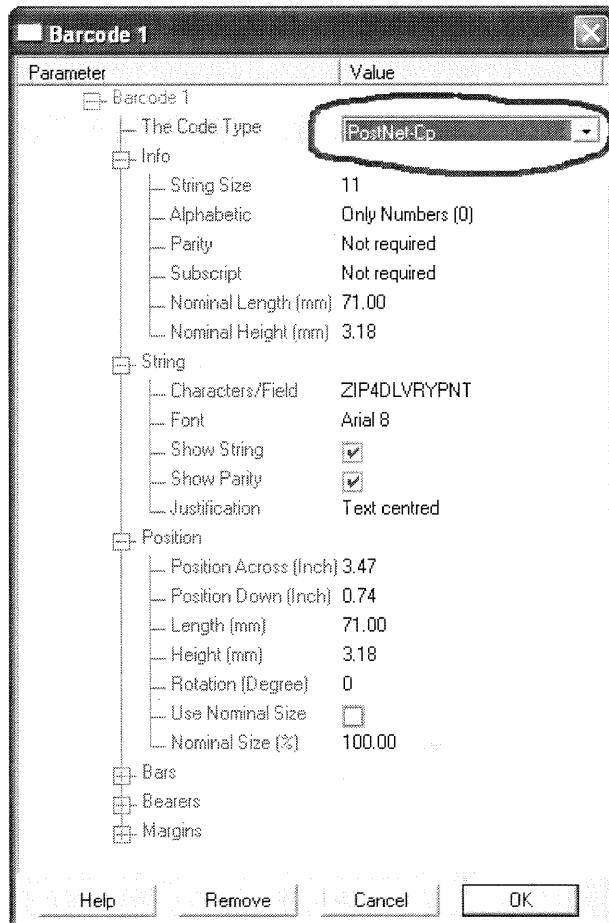
6. Font and alignment parameters can be changed independently for each line of text by selecting +.

3.3.2 Adding Barcodes to a Layout

1. For standard 1D Barcodes such as Postnet, EAN, etc.- Left click on the **Create Barcode Icon** and position the Barcode on the layout.
 2. For 2D Barcodes such as Maxicode, PDF417, etc. - Left click on the **2d Barcode Icon** and position the Barcode on the layout.



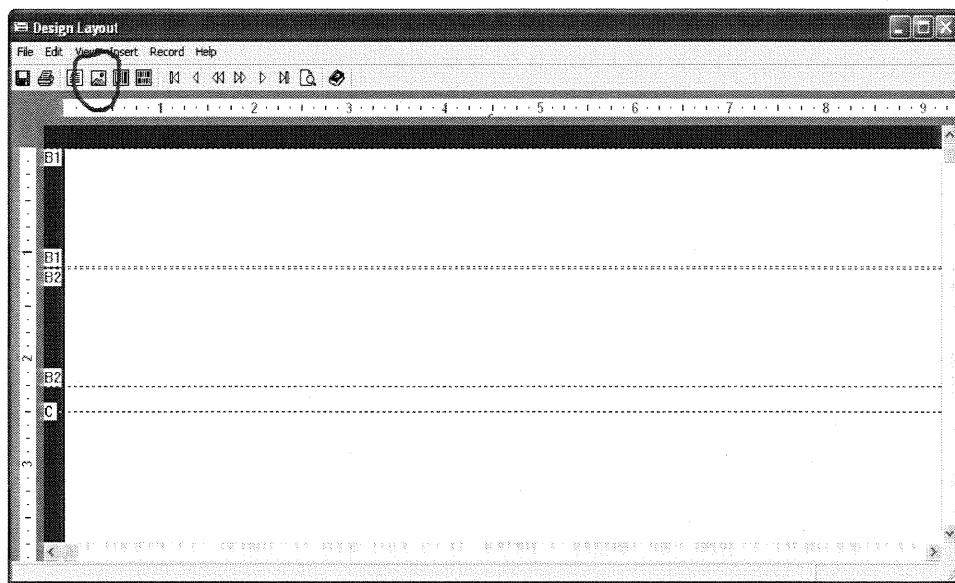
- Once the Barcode is positioned a Barcode Box will appear. Select **Code Type** and a drop down menu will allow you to choose from a list of various Barcode types.



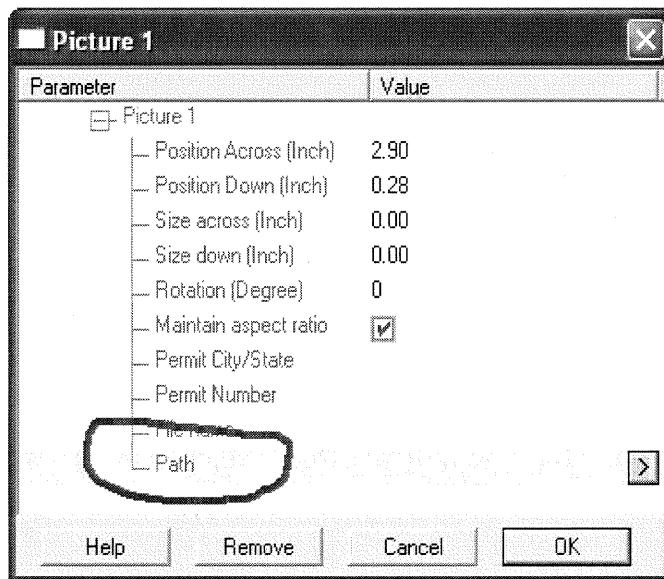
4. Select **Characters /Field** and a drop down menu will allow you to choose a valid field for Barcode Data.
5. Ensure that a value is set for **Length and Height** or an error message “Generated line width less than 1 unit” will occur.

3.3.3 Adding Bitmaps to a Layout

1. Left click on the **Create Bitmap Icon** and position the Bitmap on the layout

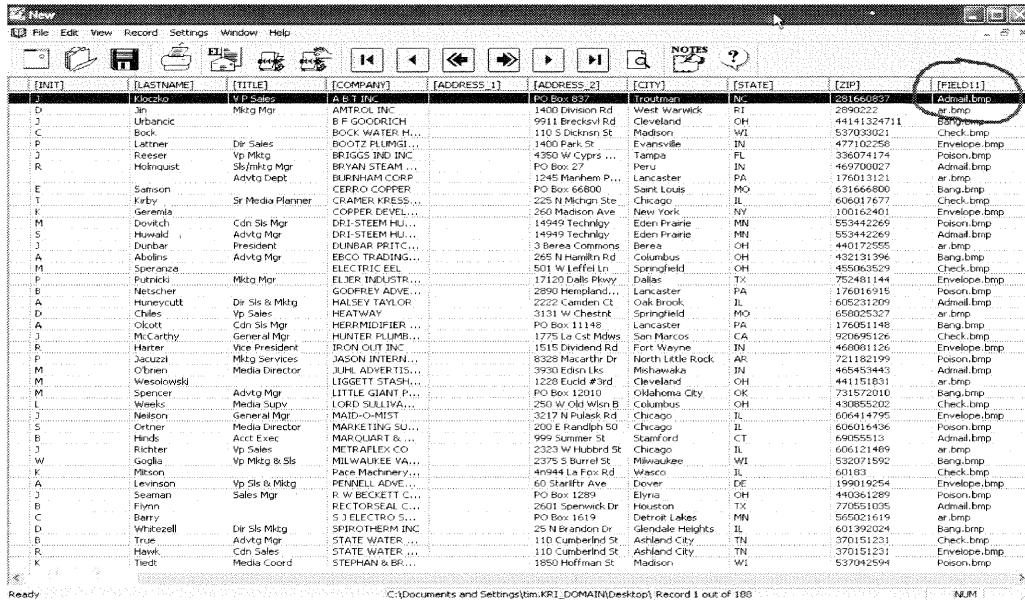


2. Once the position is set a Picture box will appear and an error message; "Error: File doesn't exist" will appear on the layout window.
3. Select **Path** to choose a location of a stored Bitmap file.



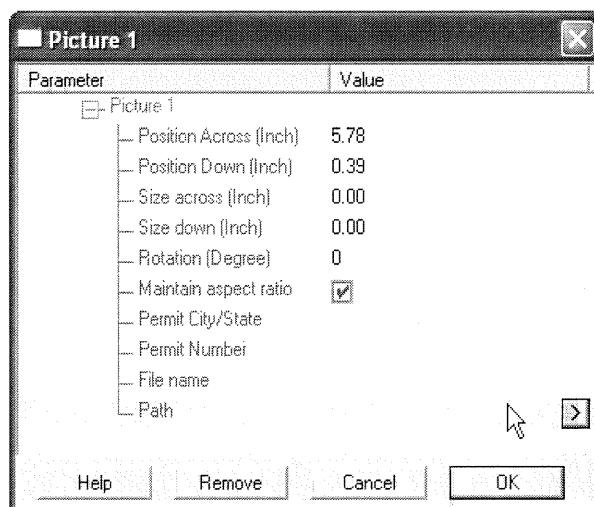
3.3.4 Using Variable Bitmaps

- The Data file should contain a field with the names of the variable Bitmaps. The sample database below has the Bitmap data located in Field 11. Note: Each file requires a .bmp extension in order for the software to recognize the data.

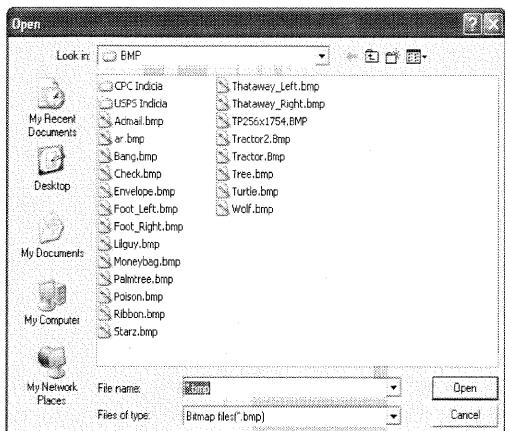


[INIT]	[LASTNAME]	[TITLE]	[COMPANY]	[ADDRESS_1]	[ADDRESS_2]	[CITY]	[STATE]	[ZIP]	[FIELD11]
J	Kleczko	V.P. Sales	AMTRON INC	1400 Division Rd	Rock Island	IL	60101-0637		
D		Mktg Mgr	B F GOODRICH	9911 Breckin Rd	Wickliffe	OH	44141-324711	Bang.bmp	
C	Urbancic		BOCK WATER H...	110 S Dickin St	Cleveland	OH	44103-39021	Check.bmp	
P	Bock		BOOTZ PLUMG...	1400 Park St	Madison	WI	53703-39021	Envelope.bmp	
J	Lettner	Dir Sales	BRIGGS IND INC	4350 W Cypress	Evansville	IN	47710-2258	Poison.bmp	
R	Reeser	Vp Mktg	BURGHAM CORP	1245 Marchen P...	Tampa	FL	33607-74174	Admail.bmp	
H	Holmquist	Sales Mgr	CERRO COPPER	PO Box 66800	Lancaster	PA	17601-3121	Ar.bmp	
E		Advtg Dept	CERRO COPPER	225 N Michigan Ste...	Saint Louis	MO	63166-6800	Bang.bmp	
T	Samson		CRAMER KRESS	225 N Michigan Ste...	Chicago	IL	60601-7677	Check.bmp	
K	Kirby	Sr Media Planner	COPPER DEVEL...	225 N Michigan Ste...	New York	NY	10016-2446	Envelope.bmp	
M	Gervena		COFFEE CO. INC	14949 Technology	Minneapolis	MN	55431-6669	Poison.bmp	
D	Douglas	Cdn Sls Mgr	DRI-STEEM HU...	3 Bereda Commons	Eden Prairie	MN	55344-2269	Admail.bmp	
S	Huswald		DUNIBAR PRITC...	265 N Hamlin Rd	Berea	OH	44017-72555	Ar.bmp	
J	Dunbar	President	EBCO TRADING...	501 E Leffel Ln	Columbus	OH	43213-1996	Bang.bmp	
A	Abolins		ELDER INDUSTRI...	7110 W 40th St	Springfield	OH	45504-3574	Check.bmp	
M	Spiegelman		ELDER INDUSTRI...	2890 Hemplands	Lancaster	PA	17601-6144	Envelope.bmp	
P	Streicher		GOODEFREY ADVE...	2222 Camden Ct	Oak Brook	IL	60521-209	Poison.bmp	
A	Hunevall	Dr Sls & Mktg	HALSEY TAYLOR	3131 W Chestn...	Springfield	MO	65902-5327	Admail.bmp	
D	Chiles	Vp Sales	HEATWAY	PO Box 1114	Lancaster	PA	17605-1148	Bang.bmp	
A	Olcott	Cdn Sls Mgr	HERMAN MILLER	14949 Technology	West Des Moines	IA	50266-209	Check.bmp	
J	Hickey		HINTER PLUMB...	1515 Dividend Rd	Fort Wayne	IN	46200-1126	Envelope.bmp	
R	Horne	Vice President	IRON CUT INC	1228 Euclid #3rd	North Little Rock	AR	72118-2199	Poison.bmp	
F	Jacuzzi	Mktg Services	JASON INTERN...	3930 Edison Lk...	Mishawaka	IN	46545-3443	Admail.bmp	
M	O'Brien	Media Director	JUHL ADVERTISI...	100 N Wacker Dr	Cleveland	OH	44115-1631	Ar.bmp	
M	Wesolowski		LIGGETT STASH...	3217 N Pulaski Rd	McKeesport	PA	75157-1010	Bang.bmp	
M	Spencer	Advtg Mgr	LORD SULLIVAN	3217 N Pulaski Rd	Chicago	IL	60644-202	Envelope.bmp	
N	Wright	Media Supv	MADISON-MIST	200 E Randolph St	Chicago	IL	60601-6436	Poison.bmp	
J	Nelson		MARKETING SU...	900 N Michigan	Stamford	CT	69955513	Admail.bmp	
S	Ortner	Media Director	MACQUART & C...	2330 W Hubbard St	Chicago	IL	60614-2146	Ar.bmp	
B	Hinds	Acct Exec	METACOM	375 S Bond St	Milwaukee	WI	53207-1992	Bang.bmp	
D	Blitzer	Vp Sales	MILWAUKEE VA...	46944 Le Fox Rd	Wauco	IL	601183	Check.bmp	
W	Gogols	Vp Mktg & Sls	Pace Machinery...	60 Shaffir Ave	Dover	DE	19901-9254	Envelope.bmp	
K	Miron		PENNELL ADVE...	P.O. Box 1289	Elyria	OH	44036-1289	Poison.bmp	
A	Levinson	Vp Sls & Mktg	R. W. BECKETT C...	200 S Seminary Dr	Portland	OR	97065-1095	Admail.bmp	
J	Seaman	Sales Mgr	REFINERIES C...	100 N Wacker Dr	Seattle	WA	98101-1619	Ar.bmp	
B	Finn		REFINERIES C...	25 N Brandon Dr	Glenelde Heights	IL	60119-2024	Bang.bmp	
C	Reyn		REFINERIES C...	110 Cumberland St	Ashland City	TN	370151231	Check.bmp	
D	Whitezell	Dir Sls Mktg	SHIROTHERM INC	110 Cumberland St	Ashland City	TN	370151231	Envelope.bmp	
B	True		STATE WATER ...	1850 Hoffman St	Madison	WI	53704-2594	Poison.bmp	
R	Hawk		STATE WATER ...						
K	Tiedt	Media Coord	STEPHAN & BR...						

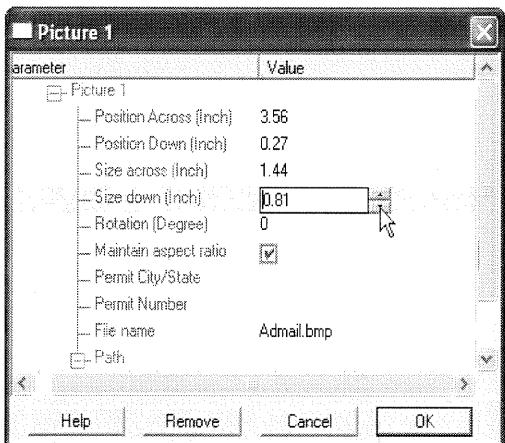
- Select the **Bitmap Icon** and position the desired location of the Bitmap on the layout.
- A picture box will appear. Select **Path** to find the folder containing the Bitmaps you want to print.



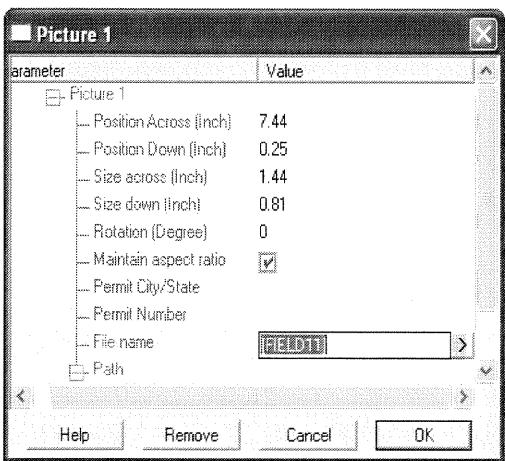
4. Select any of the Bitmaps in the folder that will be printed.



5. Scale the image to the proper size by selecting **Size down**.



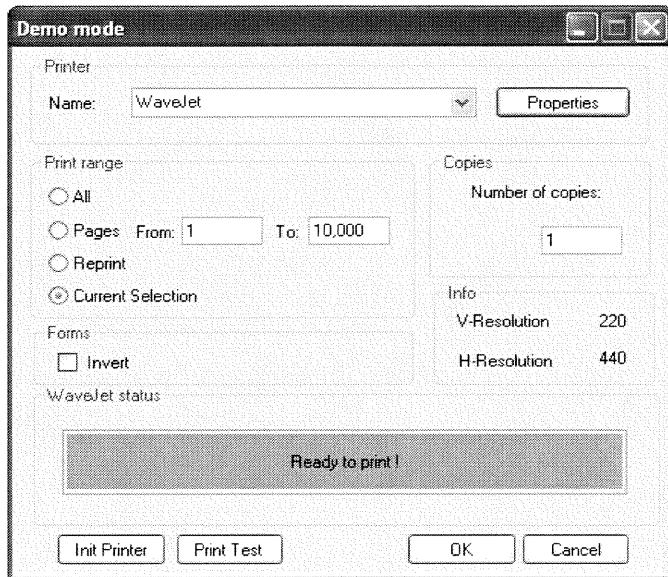
6. Select **File name** and choose the field, which contains the .bmp data. In this case, Field 11.



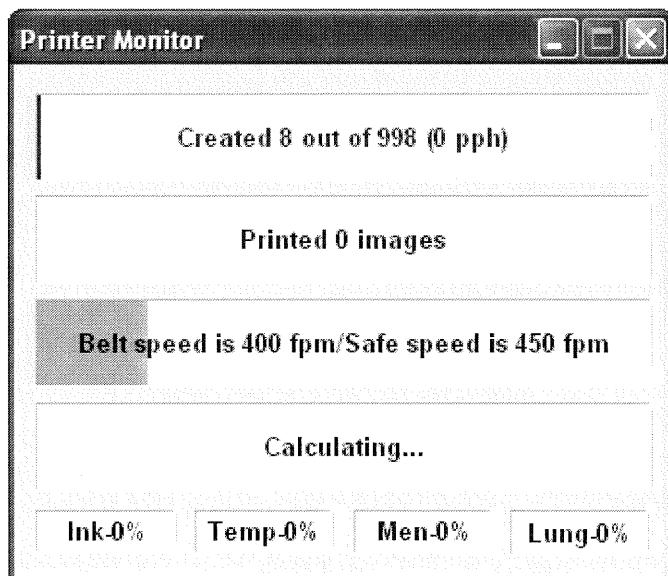
7. View the layout screen and scroll through the records to verify that the Bitmaps are changing.

3.4 Printing the Layout

- When you are satisfied with the layout and are ready to print, select the **Printer Icon** and the following screen will appear:



- Choose the **print range** and select **OK**.
- A window will appear verifying the number of records to print. Choose **Yes** and the Printer Monitor window will appear:

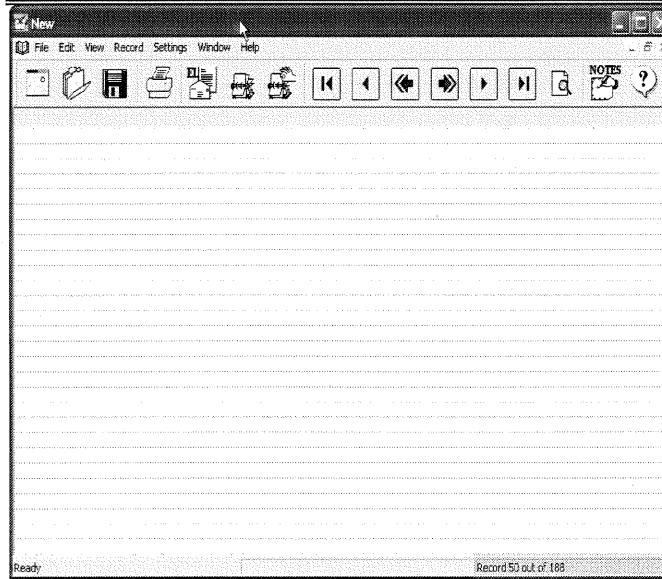


4.0 USER INTERFACE

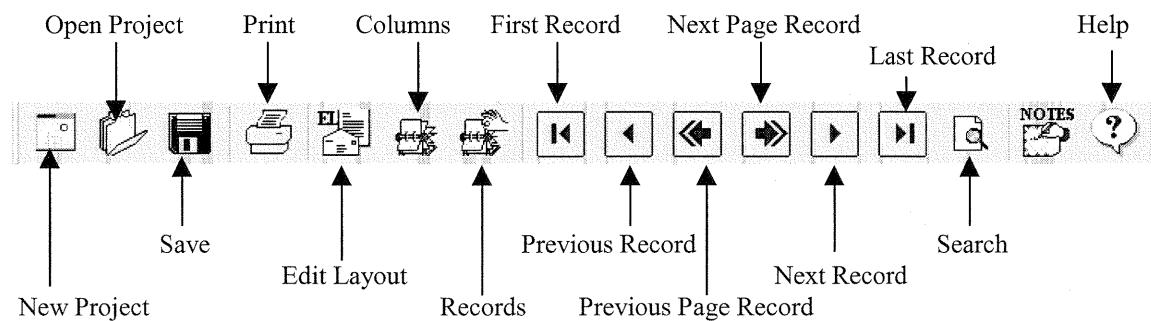
In the previous section we were able to quickly create and print a layout from a Database. This section explains the functions of the WaveJet Graphical User Interface (GUI).

Main Menu Screen

The Main Menu Screen is comprised of Tool bar and Menu Options. The Toolbar Icons are shortcuts to the most commonly used functions. The Main Menu also displays the database fields from a selected project.



4.1 Tool Bar Functions



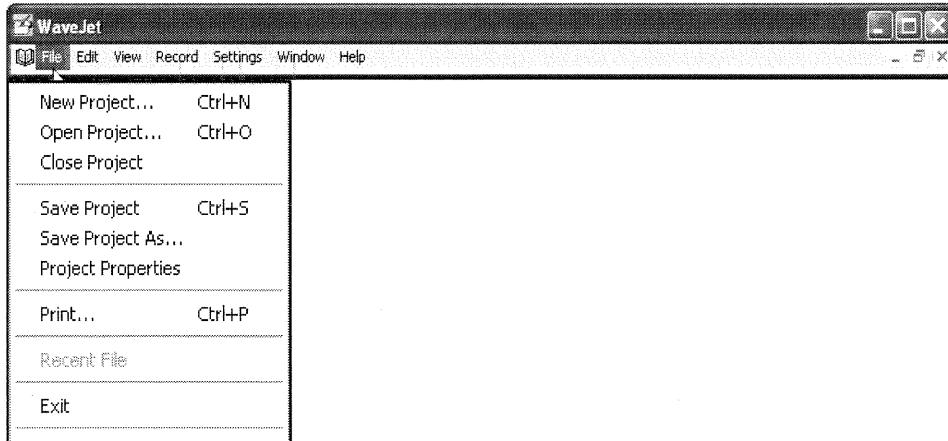
4.2 Menu Options

The Main Menu has drop-down menus, which allow you to select most functions.



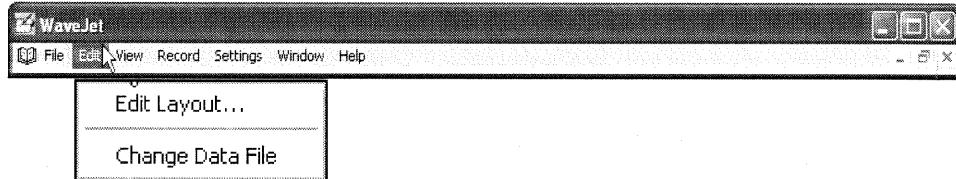
NAME	DESCRIPTION
File	Open new or saved projects. Save projects or save as under a new name. Select print menu and project properties.
Edit	Edit layout and change data file.
View	Changes view of database to either columns or by records.
Record	View or search records
Settings	Opens options window for setting bundle and tray breaks.
Window	Cascade
Help	Help topics and “about” information.

4.2.1 File Menu



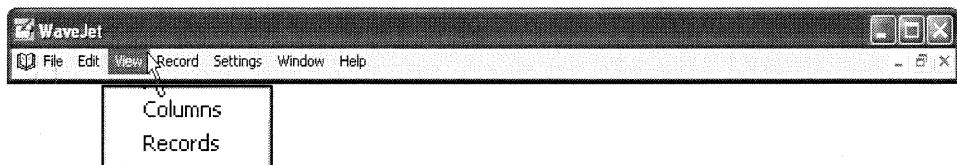
NAME	DESCRIPTION
New Project	Selects a data source used to create a new project
Open Project	Opens an existing project
Close Project	Closes an open project
Save Project	Saves project under same name
Save Project As	Saves project under a new name or location
Project Properties	Opens a menu that details project properties
Print	Prints database
Recent File	Lists most recent files opened
Exit	Exit menu

4.2.2 Edit Menu



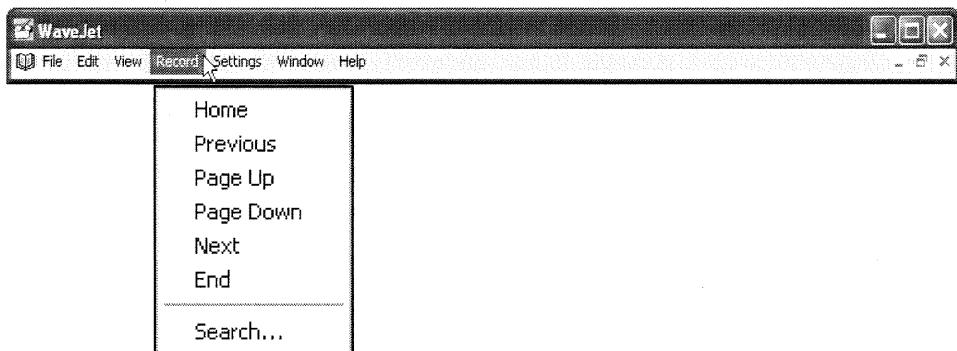
NAME	DESCRIPTION
Edit Layout	Opens Design Layout window for editing
Change Data File	Allows you to print from a new database using the current layout (Note: The new database must be the same type and contain the same fields)

4.2.3 View Menu



NAME	DESCRIPTION
Columns	View data in columns
Records	View data by records

4.2.4 Record Menu

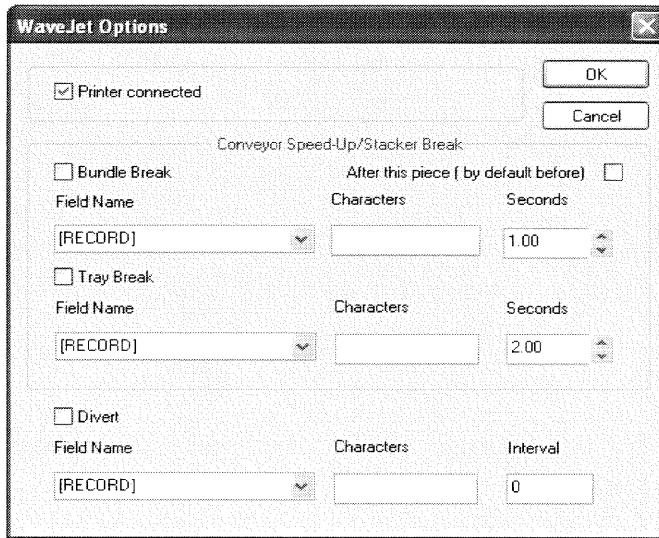


NAME	DESCRIPTION
Home	Selects first page of database
Previous	Selects previous record
Page Up	Selects last page of records
Page Down	Selects next page of records
Next	Selects next record
End	Goes to last page of database
Search	Opens a search menu, which allows you to search data by various criteria.

4.2.5 Settings Menu

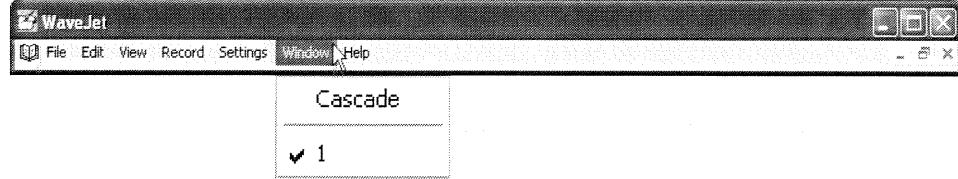


Selecting Settings opens up the WaveJet Options Menu. This menu is used to set **Bundle** and **Tray breaks**. In addition, the **Divert** option allows you to select certain records that can be diverted after being printed for QC sampling.



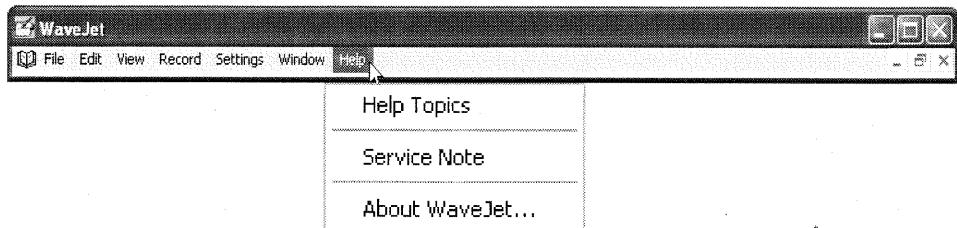
NAME	DESCRIPTION
Bundle Break	Select this box to create a bundle break. You must enter the desired field and characters for the system to recognize where the break is to occur.
Tray Break	Select this box to create a tray break. You must enter the desired field and characters for the system to recognize where the break is to occur.
Divert	Selecting the Divert option allows you to select certain records that can be diverted after being printed for QC sampling. Enter the desired field and character to select a record for diverting.

4.2.6 Windows Menu



NAME	DESCRIPTION
Cascade	Rearranges screens in a specific order

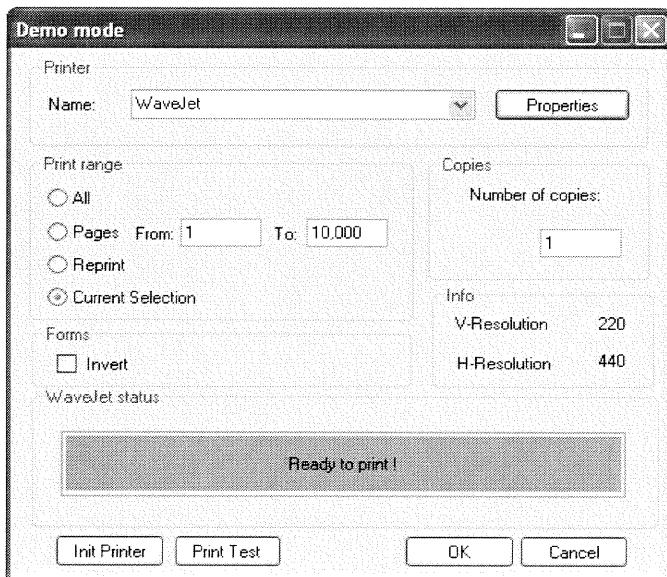
4.2.7 Help Menu



NAME	DESCRIPTION
Help Topics	Brings you to the Help Topics Menu
Service Note	Allows you to log service history on the system
About WaveJet	View current version of WaveJet Software

4.3 Print Menu Screen

Selecting the Printer Icon or selecting Print from the File Menu will open the Print Menu Screen.



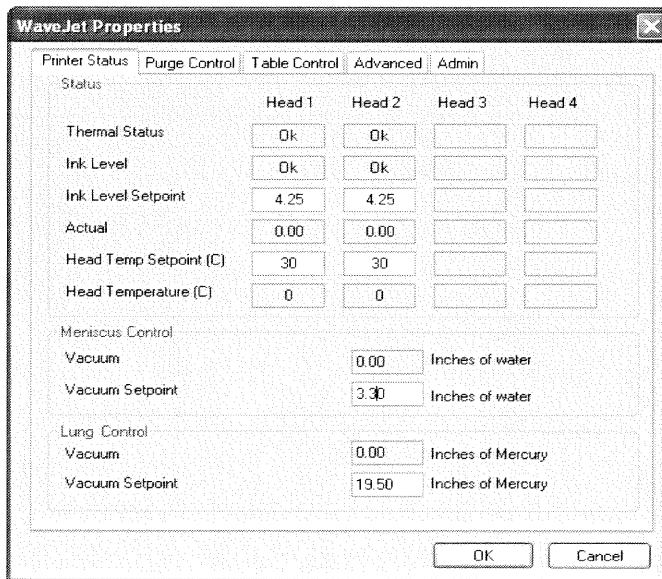
4.3.1 Printer Properties

Selecting Properties on the Print Menu will open the WaveJet Properties Screen. This screen has several Tabs, which bring up other screens and functions

NAME	DESCRIPTION
Properties	Opens window used for viewing system controls
Print Range	Allows you to print entire database or selected pages from database
Forms	Selecting this box will invert printed image
WaveJet Status	Displays current status of printer
Info	Displays Horizontal and Vertical resolution of current job to be printed
Init Printer	Select in order for the electronics to recognize the print heads. Must be done every time system is booted.
Printer Test	Selecting this box will print out 5 copies of a test pattern useful for diagnostic purposes

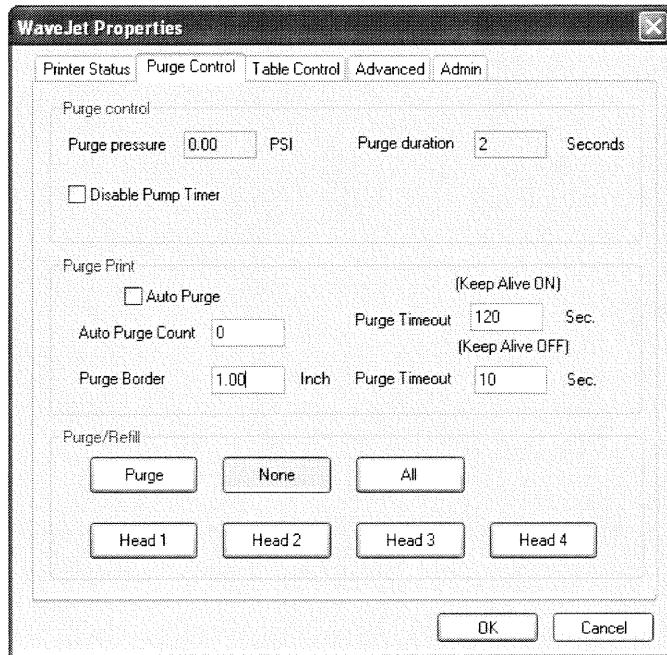
4.3.2 Printer Status

The first Tab on the WaveJet Properties screen is the Printer Status Tab. This window displays the status of the Ink, Pneumatics, and Head temperature.



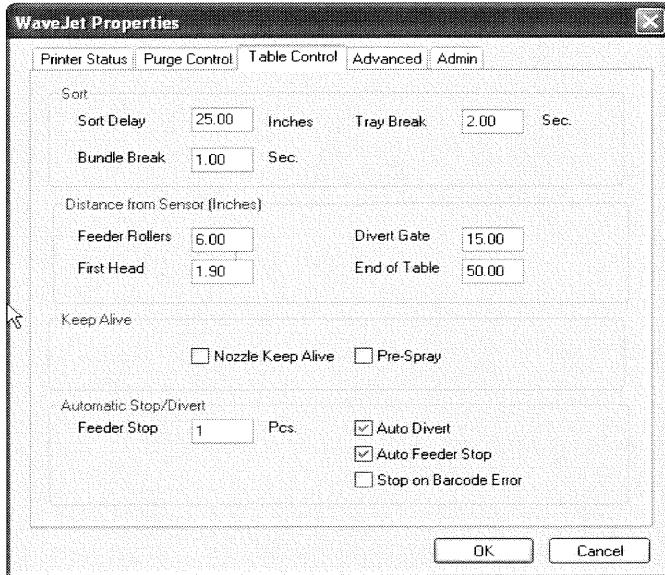
NAME	DESCRIPTION
Thermal Status	Will display "Heating" until the Print head temperature reaches the temperature set point.
Ink Level	Will display "Filling" until the Ink Level reaches the set point.
Ink Level Set point	Factory setting which determines the "Full" level of the ink reservoir
Ink Level Actual	Displays actual ink level reading
Head Temp Set point	Factory setting which determines the operating head temperature
Head Temp Actual	Displays actual head temperature reading
Meniscus Vacuum	Displays actual meniscus vacuum reading
Meniscus Vacuum Set point	Factory setting for proper meniscus vacuum level
Lung Vacuum	Displays actual lung vacuum reading
Lung Vacuum Set point	Factory setting for proper lung vacuum level

4.3.3 Purge Control



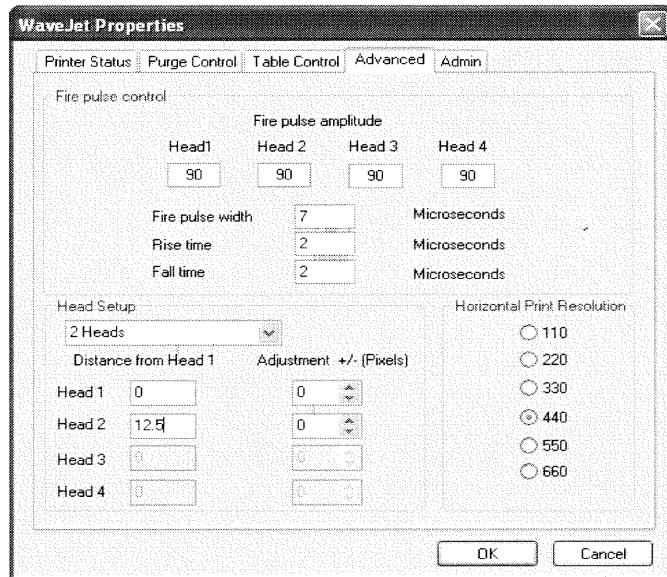
NAME	DESCRIPTION
Purge Pressure	Factory setting of air pressure, measured in pounds per square inch, used to purge ink out of print head
Purge duration	Length of time in seconds of air purge
Disable Pump Timer	Allows continuous running of the Ink pumps. Only select when replacing print heads.
Auto Purge	Select this box if you need to add a printed purge piece
Auto Purge Count	Frequency of printed purge pieces
Purge Border	Determines the length of the purge print
Purge Timeout Keep alive "On"	Determines the length of time in seconds, while the belts are running (Keep alive "on") and the system is not printing, before the system will print a purge piece.
Purge Timeout Keep alive "Off"	Determines the length of time in seconds, while the belts are off (Keep alive "off") before the system will print a purge piece.
None	Default setting. No heads are selected for air purging
All	Selects all heads for air purging
Head 1	Selects head 1 for air purging
Head 2	Selects head 2 for air purging
Head 3	Selects head 3 for air purging
Head 4	Selects head 4 for air purging

4.3.4 Table Control



NAME	DESCRIPTION
Sort Delay	Distance measured from the product sensor to the conveyor which determines physically on the system, where the bundle and tray breaks will occur
Bundle Break	Default duration of bundle break
Tray Break	Default duration of tray break
Feeder Rollers	Distance from product sensor to feeder rollers
First Head	Distance from product sensor to first print head nozzle
Divert Gate	Distance from product sensor to divert gate
End of Table	Distance from product sensor to end of table
Nozzle Keep Alive	Turns on the Keep alive function, which turns on unused jets at a set frequency, in order to maintain image quality
Pre-Spray	Feature, which prints a small vertical line in between each piece in order to keep unused jets alive. Can be used in lieu of the nozzle keep alive function if background dots are unacceptable.
Feeder Stop	Number of pieces fed, after an error, before the feeder stops
Auto Divert	Diverts any purge or unprinted piece into the divert tray
Auto Feeder Stop	Automatically stops feeder after the last record is printed
Stop on Barcode Error	Automatically stops feeder after a Barcode error is detected

4.3.5 Advanced

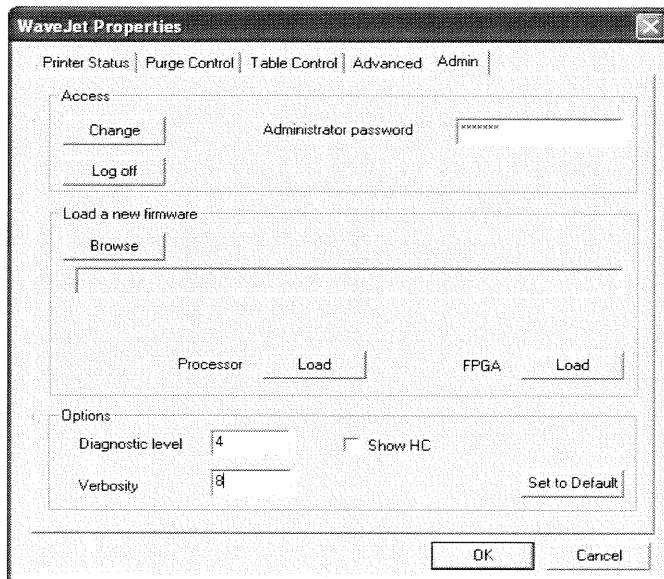


NAME	DESCRIPTION
Fire Pulse Amplitude	The voltage, which yields the optimum drop mass of ink for each head.
Fire Pulse Width	The value which yields the optimum image quality for the ink being used
Rise Time	Duration of rising edge of fire pulse
Fall Time	Duration of falling edge of fire pulse
Head Setup	Configures the number of heads the system will print with
Distance from Head One	Measured distance from head one to each head. This is the coarse horizontal stitching adjustment
Adjustment +/- Pixels	This is the fine horizontal stitching adjustment
Horizontal Print Resolution	Selects the Horizontal or process direction resolution

4.3.6 Admin

Note

This is a password-protected screen and should only be used by trained service personnel.



NAME	DESCRIPTION
Administrator Password	Allows use of diagnostic functions and firmware upgrades
Change	Allows you to change the password
Log off	Logs you off as an administrator
Browse	Select to locate firmware
Processor	Selecting will load coldfire code selected
FPGA	Selecting will load FPGA code selected
Diagnostic Level	Determines the amount of diagnostic information that is shown on the HC window
Verbosity	Determines the amount of diagnostic information that is shown on the HC window
Set to Default	Sets diagnostic and verbosity defaults

5.0 MAINTENANCE PROCEDURES

This section describes clearing clogged jets through the use of a number of techniques, both automated and manual. Jets that are clogged, firing crookedly or in spirals, are usually experiencing problems caused by air bubbles or particles inside, behind, or in front of the nozzles. In most instances, it is possible to correct these jetting problems by using any or all of the techniques described in this section. These techniques, however, will not correct problems caused by 1) mechanical damage to a print head, 2) debris too firmly wedged into or behind nozzles, 3) clogged print head filters, or 4) agglomeration or degradation of fluid in the print head.

5.1 Safety Considerations

- **Heat:** print heads and fluids may be hot, depending on system operating temperatures.
- **Solvents:** Some fluid formulations may contain hazardous solvents. Appropriate protective clothing, gloves, eyewear, and ventilation should be utilized.
- **Aerosols:** Some fluid formulations may emit hazardous aerosols or vapors. Appropriate protective clothing, gloves, eyewear, and ventilation should be utilized.
- **Electrical:** The print head should be properly earth-grounded. The print head should not be handled while it is printing (while high-voltage fire pulses are present at the print head). The operator should employ appropriate anti-static precautions while handling the print head.

5.2 Air Purge

One or two Purges in succession will often be sufficient to clear minor jetting problems, such as a single jet not firing. A purge is also useful in re-wetting the jet nozzles, and in helping to re-establish proper meniscus shape at the nozzles.

5.3 Nozzle Plate Wipe

It is very important that the material used for a face-wipe be of a nonabrasive, non-particle or fiber shedding material such as **Kirk-Rudy PN 191159**. It is important that the wiping material be clean, non-woven, non-fibrous, non-shedding, and hasn't been left in an area exposed to air-borne dust and dirt, or other sources of contamination. Oils, and in particular, silicone oils, must not be wiped onto the faceplate.

When it is necessary to perform a wipe across the nozzles, the preferred procedure is to wipe the nozzles in the "cross process" direction, so that if some debris is collected by the wipe, the debris are not then dragged across the rest of the jets. Wipe in a single, straight (not circular) motion.

5.4 Shutting Down the System

The following procedure should be followed before powering down the system:

1. Clean the nozzle plates on all print heads using a wet wipe.
2. Place a wet wipe on top of each ink seal bar assembly, KR P/N 547304-02.
3. Carefully attach an ink seal bar to each print head.
4. Move the print heads to the rear of the base so they are not positioned over the belts.
5. Power down the system.

5.5 Long Term Storage

If the system is to be idle for up to 14 days, it is recommended that all print heads be purged, cleaned and recapped at least once every other day as per the system start up procedure.

Long-term storage is considered to be over 14 days of idle time of the print heads. The following procedure should be followed if a WaveJet System is to be idle for more than 14 days:

1. Remove all ink bags from tray and replace with flushing solution bags. KR P/N 191287.
2. Purge the print heads until the liquid exiting the nozzle plates is clear.
3. Clean the nozzle plates using a wet wipe.
4. Cap the print heads and power down the system.

5.6 Installing Software

Upgrading the system software is important in order to maintain a trouble-free system and take advantage of enhancements as they become available.

1. Re-start the PC.
2. Copy the WaveJet.exe file on to the Desktop
3. Using Windows Expore, go to: C:\Program Files\WaveJet
4. Right click on WaveJet and select "rename"
5. Rename to "WaveJet Old" (This will allow you to easily revert back to the last version should a problem occur)
6. Launch the .exe file and follow the prompts. The new version will automatically copy over the existing software.
7. Once the software has completed loading, restart the system and launch the WaveJet software.

6.0 TROUBLESHOOTING GUIDE

Problem	Solution
Print Quality not acceptable	<ul style="list-style-type: none">▪ Adjust print head closer to media▪ Increase resolution▪ Lower table belt speed▪ Ensure nozzle keep alive or pre-spray is turned on▪ Implement purge piece cycle▪ Confirm media is compatible with Ink▪ Purge and wipe print head▪ Check Ink supply▪ Make sure print head is level▪ Check that head locking clamp is secure
Print is smearing	<ul style="list-style-type: none">▪ Raise print head to prevent it from dragging on media▪ Increase shingle conveyor speed to prevent overlap▪ Decrease print resolution▪ Increase dryer power▪ Clean Ink from skid plate
Does not Print	<ul style="list-style-type: none">▪ Re-boot WaveJet system▪ Check product detect sensor for proper operation▪ Check product spacing▪ Check sensor distance value from first print head▪ Check encoder LED illuminates when machine is running

7.0 NOTES

8.0 Software License Agreement

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9.0 WARRANTY AND SERVICE

Terms and Conditions WaveJet Addressing System

Warranty: All Kirk-Rudy products are warranted to be free of defects in materials and workmanship and to conform to Kirk-Rudy specifications in effect at the date of shipment. Any changes Customer requests to Kirk-Rudy specifications are not effective without advance, written authorization by Kirk-Rudy. The warranty period is as follows:

Feeder and or Transport: 90 days from date of shipment

Printing System Hardware: Six months from date of shipment

Software: 90 days from date of shipment. Warranty entitles customer to new releases, upgrades or enhancements made available to customers during the warranty period. Kirk-Rudy does not warrant that the operations of its print heads or its firmware and software will be uninterrupted and or totally error free.

Replacement Parts: 90 days from date of shipment

Exception: Any products labeled as pre-production release prototypes, warranty coverage will be on materials and workmanship only and for a period of three months from date of shipment.

Replacement Products: Balance of warranty period specified above.

During the warranty period, Kirk-Rudy will, at its option, repair, replace, or refund the purchase price of Kirk-Rudy products to the original retail purchaser which prove to be defective in materials or workmanship or which do not conform to the applicable Kirk-Rudy specifications. This warranty is not transferable. It covers damage resulting from defects in material or workmanship, and it does not cover conditions or malfunctions resulting from (1) improper installation, use, storage, care or maintenance by customer or its customers. (2) Modification or alterations of a Kirk-Rudy product. (3) Cycling or misuse of a Kirk-Rudy product out of specification; or (4) Use of inks or other chemicals not furnished or certified by Kirk-Rudy or use of inks certified by Kirk-Rudy but do not conform to established specifications or quality standards; (5) accident, damage, neglect or abuse; (6) environmental effects including but not limited to exposure to excessive contamination; or (7) exposure to conditions outside the range of the environmental, power and operating specifications provided by Kirk-Rudy.

For products returned to Kirk-Rudy for warranty repair or replacement, customer shall obtain a return materials authorization number (RMA) and shipping instructions from Kirk-Rudy, follow the proper print head cleaning/flushing procedures in accordance with the respective product manual, and return the product shipping charges pre-paid. Shipping charges for the return of products to customer shall be paid by Kirk-Rudy within the conditions within the contiguous forty-eight United States. And the District of Columbia: for all other locations the warranty excludes all costs of shipping, customs clearance and any other related charges. All replaced products shall become the property of Kirk-Rudy. It covers damage resulting from defects in material or workmanship, and it does not cover conditions or malfunctions resulting from normal wear, neglect, abuse or accident.

This warranty is in lieu of all other expressed warranties or implied warranty of merchantability or fitness for a particular purpose or any implied warranty arising out of a course of dealing custom or usage of trade.

Limitation of Remedies: If product is proven to be defective within the warranty period stated above, the exclusive remedy, at Kirk-Rudy's option, shall be refund the purchase price of or to repair or replace the defective product, provided that the defective product is, at Kirk-Rudy's choice, returned immediately to Kirk-Rudy or authorized service representative designated by Kirk-Rudy, or made available at user's premises in a location suitable for servicing.

Limitation of Liability: Kirk-Rudy shall not otherwise be liable for any losses or damages, whether direct, indirect, special, incidental, or consequential, regardless of the legal or equitable theory asserted, including contract, negligence, warranty, or strict liability.

To obtain replacement parts and service, contact an Authorized Kirk-Rudy Dealer. Use Kirk-Rudy part numbers when ordering.

USE ONLY GENUINE KIRK-RUDY REPLACEMENT PARTS

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