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TECHNOLOGY GROUP

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Find the *Mettler Toledo / Bohdan AWS-1323 / AWS-1324* at our website: *Click HERE*



A WS **1323,132.4**

1. 2.

3. 4. 5.

6. 7. 8. 9.
10.

11. 12. 13.

14. 15.

16. **17.**

18.

Quick Start Guide

Install Workstation (Operation Manual, section 4)
Verify Workstation is leveled (Operation Manual, section 4.4)
Verify air pressure (80 psi)
Turn vacuum on
Turn Workstation main power switch on before turning on theCPU
Turn CPU and monitor on
Empty waste containers
Empty waste tip pan
Fill solvent reservoirs
Fill the deep well plate chilled rack with water to the filling line
Turn on recirculator and set the temperature
Start Windows
Start Teach module if not taught, review the Operation Manual, section 5.3. If taught then skip to step # 15
Teach all positions, then exit Teach program
Use the Visual Mapping Program to generate mapping files, then exit The Visual Mapping program.
Review the attached Bohdan Visual Mapping Program Guide
Start A WS program

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Select "Input" submenu to verify and/or modify the "Transfer Volume" and "Diluent Volume" of mapping files
Select "Aux" submenu to check all sensors and to adjust turn table speed and capper/decapper gripper spin speed if needed

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23. 24.

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Select "Method" submenu to create, modify methods
To perform main process, load pipette tips consecutively
from "Start Tip Position" to " Number *of* Samples to
process "
To perform Syringe Validation and Replication subprocesses, load pipette tips consecutively from # 1 tip position *of* the # 1 pipette tip rack to " Number *of* Samples to process"
Load the racks with vials consecutively from "Start Sample Position"
Prime the small syringe first with minimum *of* 1.5 mL diluent Prime the large syringe second with minimum *of* 15 mL diluent
Select "Unit" submenu to verify "Syringe Parameters" and "Tip Touch" Parameters
Select "Process" submenu to enter all "Run Parameters"
Click "OK" on confirm screen
Check on all prompts
When Process completed click on "OK"
View or print report as needed
Exit report
Repeat for next group *of* samples or exit software and turn
off all modules

Notes &

Tips

1. To maintain the vial and deep well plate racks chilled at 4 °c
   the recirculator temperature should be set at -2 °C - 0 °C

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2. To perform any sub processes the pipette tips should be loaded consecutively from the position # 1 of pipette tip rack # 1
3. To perform any main processes the pipette tips should be loaded consecutively from the "Starting Tip Position"

4. Use caper/decapper gripper spin speed adjustment knob located on the left side of the chassis to adjust gripper spin speed
5. Use bar code turn table speed adjustment knob located on the left side of the chassis to adjust turn table spin speed
6. Recommended syringe speed ranges:

0.25 mL S):ringe

Label

-

Liquid Transfer Parameters Sample Aspiration Speed
Sample Aspiration Delay
Sample Dispense Syringe Speed Sample Dispense Delay
Diluent Addition & Cannula Wash Parameters
_Diluent Fill Syringe Speed Diluent Fill Delay
Diluent Dispense Syringe Speed Diluent Dispense Delay
Cannula Wash Volume
Inner Chamber Waste Drain Time Cannula Soak Time

Limits

1-40
0 - 99 sec 1-40
0-99sec

1 **- 40**
0-99sec 1 - **40**
0-99sec
0.250 - 50.000 mL
0-99sec 0-99sec

Recommended

12-
1 - 6- 0-

14 4 9 2

6 -10
0-2 6-10 0-2

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>lmL
3-6
0

10 mL Syringe

Label

Liquid Transfer Parameters Sample Aspiration Speed Aspiration Delay
Sample Dispense Syringe Speed Sample Dispense Delay
Diluent Addition & Cannula Wash Parameters
Diluent Fill Syringe Speed Diluent Fill Delay
Diluent Dispense Syringe Speed Diluent Dispense Delay
Cannula Wash Volume
Inner Chamber Waste Drain Time Cannula Soak Time

Limits

1-40
0-99sec
1-40
0-99sec

1 - 40
0-99sec
1-40
0-99sec
0.250 - 50.000 mL
0-99sec 0 - 99 sec

Default

15-18
1-3
9 -12
0-2

15
0 10-15
0
5 - IS 3-6 0-2

AWS 1323, 1324

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Visual Mapping Program Guide

Click on To build the "Visual Mapping from main mapping file click on "Process program menu Select "Mapping submenu and will appear

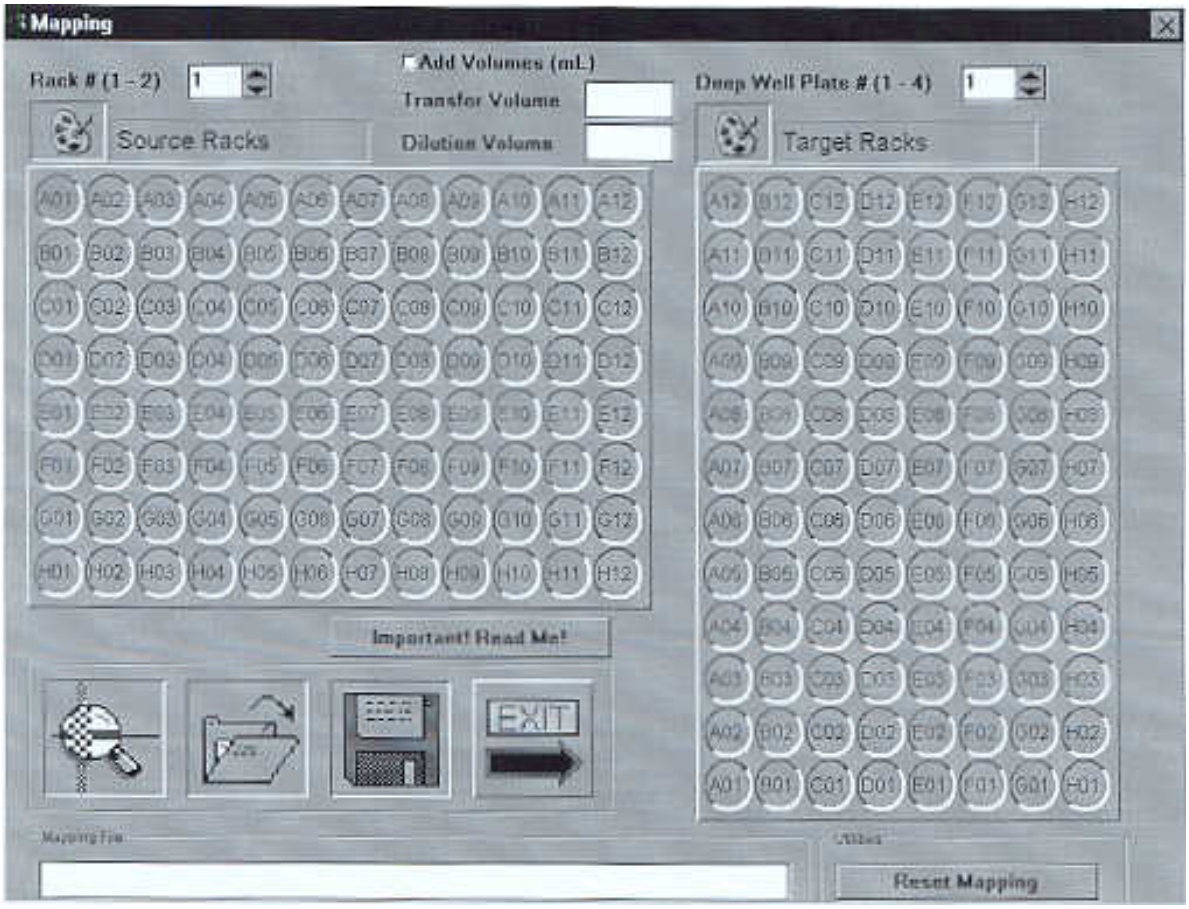
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the

graphic

mapping

screen





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A WS1323, 1324 Visual Mapping Guide Page 2 of3

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11. 12. 13.

Click on the "File Open" figure to open an existing mapping file or click on the "Reset Mapping" button to start a new mapping file
To defme a source vial
. Select "Rack Number"
. Point and click on the desired vial position in the "Source Rack" figure
To defme target wells
. Select "Deep Well Plate Number"
. Point and click on the desired well positions in the "Target Rack" figure
. Each source vial can have multiple target wells
Repeat steps #5 - #6 to define the remaining mapping sequence
Enter the "Transfer Volume" for the entire mapping file
Enter "Diluent Volume" for the entire mapping file
Check the "Add Volumes" check box to apply the "Transfer Volume" and the "Diluent Volume" to the mapping file
Click on the "Magnifier" figure to view the text mapping file Click on the "Disk" figure to name and save the file
Click on the "Exit" figure to abort the program

Notes & Tips

1. Any source sample vial position can be chosen as the starting point for a run, all source samples, however, must be run consecutively (without skipping any source sample positions)
2. All target positions can be chosen randomly
3. The "Add Volume" check box must be checked to apply the "Transfer Volume" and the "Diluent Volume" parameters to the entire file

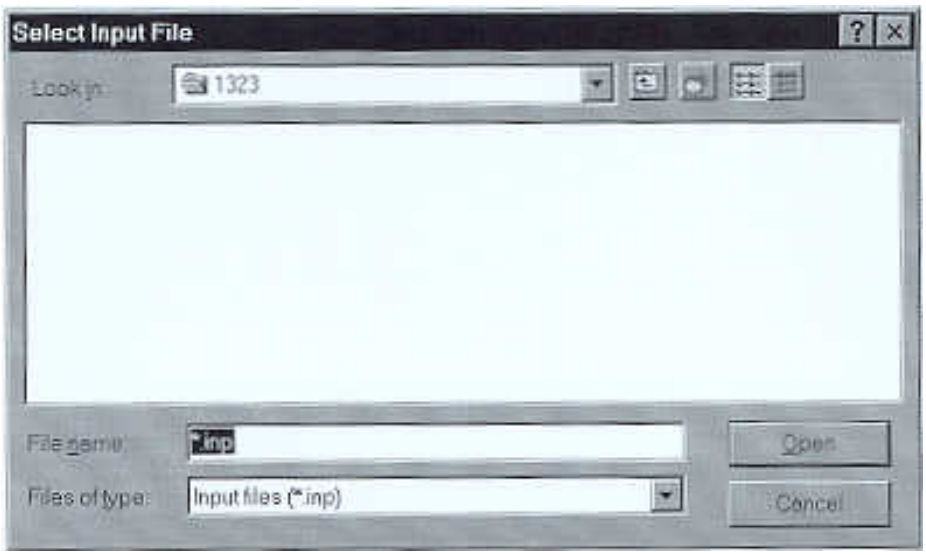
4

If the "Transfer Volume" and the "Diluent Volume" needs to be assigned for each sample transfer, follow the instructions below: a. Create a mapping file using the Bohdan Visual Mapping

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program

b. Go to Bohdan main menu, then "Input "submenu:



c.

d.

e. f.

Select the mapping file created by the Bohdan Visual Mapping file
Open the file and modify the "Transfer Volume" and the "Diluent Volume" for each sample transferring
Save the file with a new name
Don not open the modified mapping files in Bohdan Visual Mapping program

~ 8ohdan Automation, InG.

AUTOMATED PIPETTING WORKSTATION MODEL AWS 1323
SE~L No. 122459 *OPERATIONS MANUAL*

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,.Hard **Drive Contents**

A WS Customer Comment Form

Workstation Consumable List

SECTION 1 : INTRODUCTION

CONTENTS

Section

1.1 Organization of the Manual

1.2 **About** Bohdan

1.3 General Workstation Capabilities 1-2

1.4 General Workstation Features

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Organization of the Manual

This Manual is divided into ten sections that describe the aspects of the equipment. The Sections are listed below:

Section 1: Section 2: Section 3: Section 4: Section 5: Section 6: Section 7: Section 8: Section 9:
Section 10:

Introduction Workstation Protocol Specifications Installation
Software Operation Service/Maintenance Warranty Precautions/Storage Shipping Troubleshooting

In addition to these 10 Sections, the manual has the following Appendices contained in Section 11.

Appendix A: Appendix B: **Appendix C: Appendix D:**

Workstation Diagrams
Hard Drive Contents
A WS Customer Comment Form Workstation Consumable List

NOTE: This manual may describe components or procedures which are not pertinent to your workstation. Please refer to those sections applicable to your Workstation.

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About Bohdan

Bohdan Automation, Inc., based in Mundelein, Illinois, was founded in 1969 as a product development and manufacturing company of automated equipment. Bohdan is committed to delivering a family of functionally dedicated automation products for routine laboratory operations.

As our customers experience challenges that are more comple~ regulated and demanding, our goal is to provide the highest quality Automated Laboratory Workstations that are:

. Simple
. Compact . Reliable
. Cost effective

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General Workstation Capabilities

The Workstations can be designed to automate one or a combination of the following functions:

. Liquid Dispensing
. Powder Dispensing
. Centrifuging
. Weighing
. Pipetting
. Heating . Sorting . Mixing
. pH Measuring
. Aspirating to UV NIS

. Liquid/Liquid Extracting . Liquid/Solid Extracting
. Capping/Decapping
. Evaporating
. Filtering
. Cooling
. Homogenizing
. Labeling
. Conductivity Measuring . Injecting to HPLC/IC

These should give your laboratory that competitive advantage by increasing productivity and improving the quality of the data and documentation.

General Workstation Features

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. An IBM Compatible Computer runs the Workstation, compiles and sorts results.

. The Workstation will fit on a standard benchtop or in a standard hood.

. When applicable, gas-tight syringes allow for accurate and reproducible pi petting! dispensing.

. The Workstation can integrate with a standard Mettler or Sartorius top- loader or analytical balance.

. The Workstation uses off-the-shelf test tubes, crucibles, filters, columns, vials, pipette tips, etc.

. Two X- Y -Z sample transport models are available:
Standard (table width: 26")
XL (table width: 44")

. Compact design and simple operation.

. Accurate sample processing with many viscous/dirty samples.

. User friendly flexible software for changing volumes and other procedure parameters.

. Menu driven software for convenient setup and parameter selection.

. Can be enclosed to help provide a safer working environment.

. Delay cycles to support timed processes/reactions as needed.

. Removable sample racks for easy loading/unloading.

..

SECTION 2 : WORKSTATION PROTOCOL

CONTENTS

Section

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2.1 Workstation Protocol **2-1**

2.1 Workstation Protocol

Searle

Automated Pipetting Workstation Protocol

Project #1323, 1324

March 19, 1998

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Version 4.0.0

Description of Workstation:

The Bohdan Automated Pipetting Workstation will perform the sample bar code reading, capper/decapper, transferring, sample mapping and dilution processes for Searle.

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Workstation Components: (for Workstation 1323 and 1324)

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x- Y -Z Sample Transport Chassis -XL (2)

Capper/Decapper Assembly for Plastic Sample Vials (2) Sample Vial Pedestal Nest (2)

Gripper Fingers for Sample Vials, (2) Pair

Locators for Disposable Pipette Tips (4)

Sample Vial Racks - 8xl2 array, (4)

Sample Rack Chiller, 4°C, (2)

Four Position Deep Well Plate Bath/Chiller Rac~ 4°C, (2)

Locating Plate for Deep Well Plate Bath/Chiller, (2)

10. Deep Well Plate Cover, Removable, (8)

1. Manual Drainage Valve for Deep Well Plate Bath/Chiller, (2)

12. Recirculator, Julabo F32 (2)

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13. Insulated Tubing, 1 Meter Length, (6)

14. Pipette Tip Rack Stand, 1 mL (2)

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16. Wash Station, (2)

17. **Bar** Code Scanner, Stationary (2)

18. Bar Code Scanner Mounting Stand, (2)

19. Bar Code Turn Table for Sample Vials, (2)

20. Optical Sensor at Turn Table, (2)

21. Capacitance Sensor for Liquid Level Sensing, (2)

22. Liquid Level Sensor Mounting Bracket, (2)

23. **Pipette Tip Remover,** (2)

24. Pipette Tip Catch Pan. Stainless Steel, (2)

25. Optical Sensor for Pipette Tip Remover, (4)

26. Three -Way Programmable Valve, (2)

27. Syringe Drive, Low Resolution, (4)

28. Syringe, 0.25 **mL,** (2)

29. Syringe, 10 mL, (2)

30. Dual Function Cannula with Interchangeable Luer Tip, (2)

31. Luer Cannula Tip, Iml Pipette Tip, (2)

32. Luer Cannula Tip, 0.2 mL Pipette Tip, (2)

33. **Cannula Mounting Bracket,** (2)

34. Bar Code Wand, Hand Held, Key Board Wedge, (2)

35. Key Board Wedge 3-Way Cable, (2)

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36. Extended 8 Serial Port/Card, (2)

37. **IBM** Compatible with CD-ROM, WindowsTM NT Software, (2)

38. WindowsTM NT Applications Software (2)

39. Visual Mapping Program Software, (2)

40. Smart Capper/Decapper Program Software, (2)

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Utili~ Requirements:

Electrical

Air

Vacuum

Bench Space

Requirements

120 Volts/ 5 Amps! 60 Hz.

80 psi, Clean, Dry {I SCFM

15" Hg (minimum)i Y2" **barb** ~tting

47"W x 21"D x 39"H

Computer: 17"W x lS"D x 16"H

Monitor: **14"W x 17"D x 16"H**

Labware:
NOTE: This Automated Workstation (A WS) will be designed specifically to work with the labware described below and will be tested with this labware for reliable operation. Any changes in labware, however minor, may prevent the Workstation from operatin~ normally.

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Item Description (Include size, vendor, and part #)	Quantity On AWS	Quantity Required for Testing AWS*
Cryovial, Plastic, 3 mL, with Cap and Label. Cat # NUNC Brand Products 366524	96 x 2	600
Beckman Deep Well Plate, 2mL, Square Well, U Bottom. Cat # 140504	4	16
Pipette Tip, 1 mL, Disposable, Conductive, Plastic. Cat # Packard, 6000591 6220655	96 x 2	1200
Pipette Tip, 0.2 mL, Disposable, Conductive, Plastic. Cat # Packard, 6000606	96 x 2	1200

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.- To be provided by customer upon approval of this protocol.

Racks:

Rack/Container Description	Array	# Racks to be made*
Aluminum Rack for Cryovial	8 x 12	4
Aluminum Rack Chiller for Cryovial Rack, 2 Position, 4°C	1 x 2	2
Aluminum/ Polypropylene Chilled Rack for Deep Well Plate, 4 Position, Covered, 4°C	2 x 2	2
Rack Locator for Pipette Tips	1 x 2	2

- # racks accommodated on Workstation simultaneously

Interactions:

Gripper Must Reach:

Cannula Must Reach:

r--Air T eStTUbes

I c~~f7Decap~

Bar Code Turn Table

IVWPedestal~st

-
Wash Station

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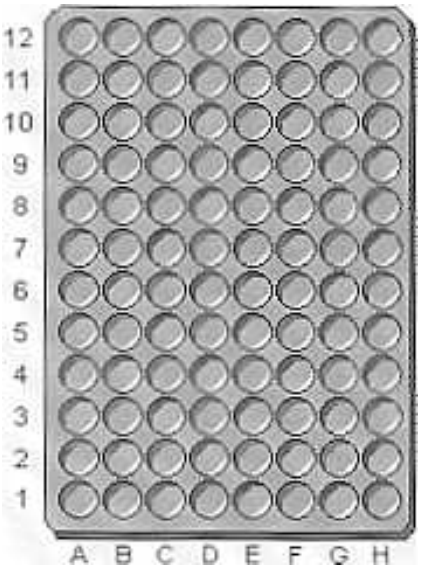
I ~apper/Dec~pper

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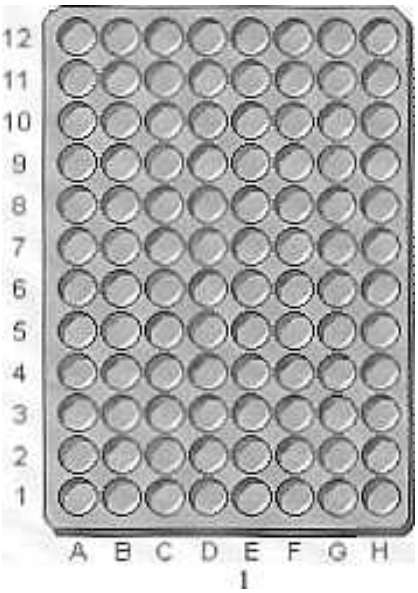
Rack Configuration.

Rack : 4 Position - Deep Well Plate Chilled Rack



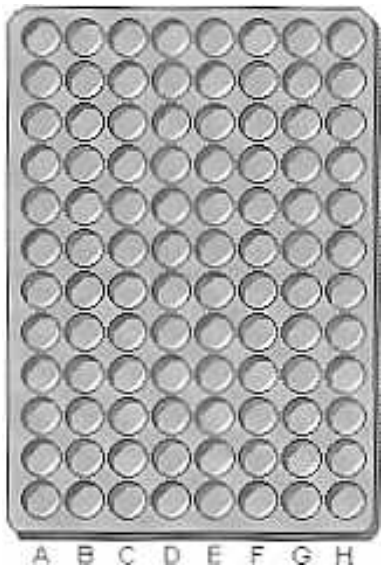
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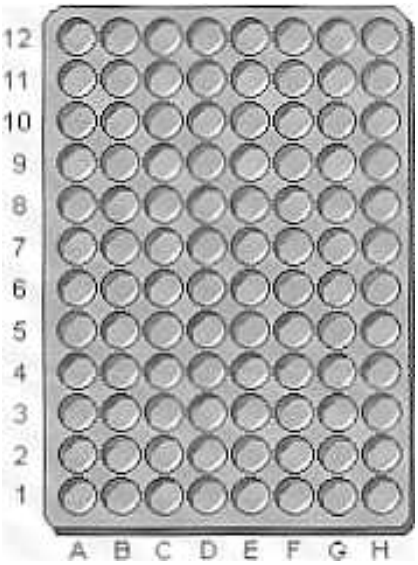
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12 11 10
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Rack

Cryovial

Chilled

Rack

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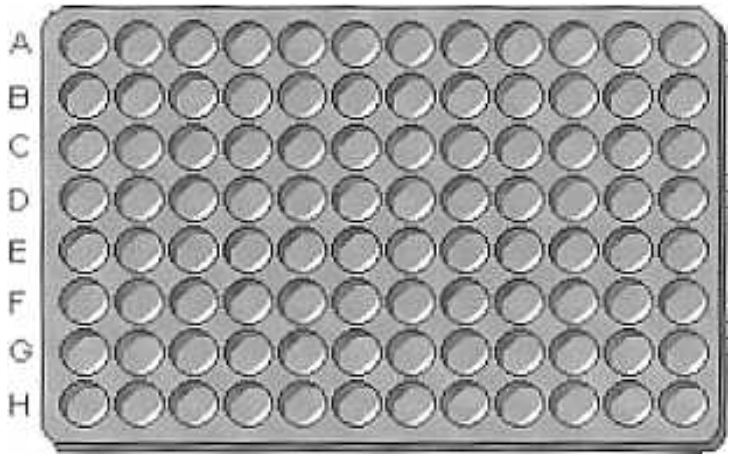
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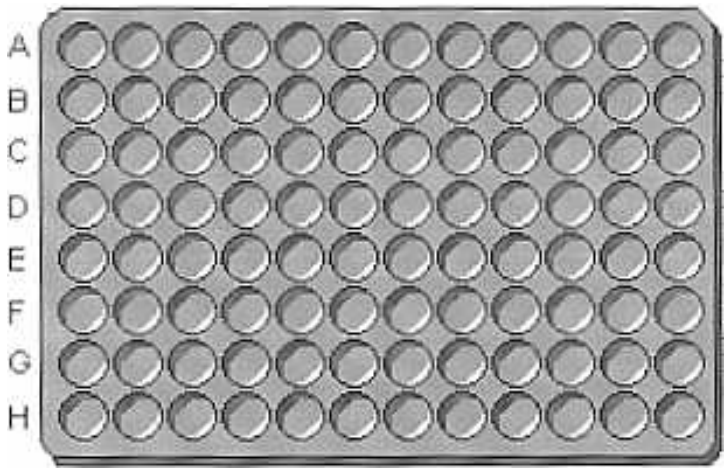
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Solvents/Diluents:

Solvent/Diluent Description	Quantity On AWS	Quantity Required for Testing AWS*
Aqueous Buffer Solution	500mL	N/A
Bleach for Cleaning/Disinfecting	N/A	N/A

•

- **Suitable substitute** to be used **for** testing.

Sample Type:

Sample Description	Quantity On AWS	Quantity Required for Testing AWS*
Liquids	400 mL	N/A

*- Suitable substitute to be used for testing.

Compatibilities:

1

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Samples will come in direct contact with:

a.

Vials

b.

Pipette Tips

c.

Cannula

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Bleach Solution will come in direct contact with

a. All **components on the Workstation**

Labels.: The bar code labels will be provided and placed on the sample vial by customer

Label Material
Bar Code Symbology Orientation

I LabeI-sIZ.e

hx~ w 2.5 **xO.8 cm**

~~~~~~~~

I Polyolefln

.Customer responsible for labels, ribbons, and custom dies.

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Special Consideration~: *Hardware:*

1

2.

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4.

The Capper/Decapper on this Workstation will have a separate control to increase the throughput.

The plastic Cryovials are capped and may have bar code labels.

The vial pedestal is designed to store a Cryovial temporarily during a process.

There will be two sizes of disposable pipette tips used on the Workstation. Only one type of the disposable tips will be used during a run. All disposable tips are conductive.

5. A capacitance sensor will be installed on the Workstation. The sensor will be used in association with the conductive tip to determine the liquid level inside a Cryovial at the Capper/Decapper station. The luer tip cannula must be electrically isolated from the Workstation arm.

6.

7.

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9.

There will be two optical sensors located at the pipette tip remover to ensure the actual removal of the tips.

A recirculator will be used to chill both the Cryovial rack and the 96 deep well plate rack. The temperature measured at any position of either the chilled vial rack or the deep well plate rack must be maintained at 4°C:t 3°C. The Bohdan application software will not interface with the recirculator. The operator at Searle will be responsible to set and operate the recirculator.

A hand held bar code reader will be used to scan the bar code of the deep well plate.

The deep well plates will be placed in a chilled water bath. overfill drainage to prevent an overfill problem.

There will be water

10. The deep well plate locating key will be designed as a removable part. This will allow the Workstation to accommodate different deep well plates in the future.

11. It is the operator's responsibility to ensure appropriate removal of the deep well plate from the water bath.

12. The deep well plates will be covered individually. The cover will be held in the grippers when the cannula accesses the deep well plate.

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13. The Workstation Liquid Dispenser will be constructed using a 0.25 mL syringe drive, a 10 mL syringe drive, a 3- Way programmable valve and a 15G removable luer tip cannula. The cannula will be mounted on the arm. Two standard syringe drives will share one cannula through a 3-way programmable valve. The tubing should be as short as possible, sample loop is not required.

14. The sample loops may be routed through the top of the arm.

15. The Wash Station will be emptied by vacuum. A vacuum sensor and a vacuum gauge are required.

16. The Cryovial cap has an external thread(more like a plug). This may cause dripping of sample liquid at the Capper/Decapper station if the Cryovial is filled all the way to the top. It is the operator's responsibility to prevent the above situation.

Software ExceptionslDeciS'ions:
1. Bohdan application software will include the following programs: Teach, Visual Mapping and Sample Preparation. The Sample Preparation program will include
Mapping, and Syringe Validation sub - programs. The visual mapping program
will allow the user to select mapping source and destination positions graphically.

2.

3

4.

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S.

The application software is capable of retrieving the Mapping Input File. It is the user's responsibility to prepare the Mapping Input Files for the run. The input files may be transferred from a Network Data Base or Bohdan Visual Mapping program. The Mapping Input Files specify the transfer volume, the diluent volume, the source sample vials and target wells in anyone of the four deep well
plates.

The "Input" submenu allows the operator to access the mapping/replication files.

There are three "push buttons" in the Prime selection: Prime, Done and Extend. In the Extend sequence, the application software will pause the process and display a message box after aspirating. The application software then switches the syringe valve to the output position to allow removal of the syringe. The dispensing sequence then finishes after the operator responds by clicking "OK" in the message box.

The "AUX." submenu includes a Check Pipette Tip Sensor, Check Vacuum Sensor, Check Liquid Level Sensor, Read Bar Code, Test Capper/Decapper, Home Arm, Gripper Open/Close, Cannula Up/Down, Remove Large Tip and Remove Small Tip selections. The" AUX" submenu will also provide a "Change Tip" selection which moves the arm to front of the chassis to allow the operator to change the cannula luer tip.

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During the Wash/Prime Process the Wash Station Outer Chamber Vacuum should be on until completion of syringe dispensing. Then the Workstation will delay for the "Cannula Soaking Time", and the Inner Chamber Vacuum starts and continues for the selected "Inner Chamber Waste Drain Time". The cannula should not be lifted up until completion of the Drain Time.

7. Application software will include a "Report" submenu which will allow the operator to open the . .RPT files and send the reports to a remote directory.

8.

9

The "Run Parameter" submenu will include an edit field to allow the operator to input company infonnation or a notebook number into the report.

The "Run Parameters" will include a "Read Bar Code" option. If the option is selected, the A WS will transfer the sample vials to the Turntable prior to the Capper/decapper module.

10. The "Sample Transfer Volume" and "Diluent Addition Volume" entries for the mapping process are selectable for each source sample.

1. The application software will enable the operator to select any vial position to start a process.

12. There will be two syringe sizes, 0.25 mL and 10.00 mI. There will also be two pipette tip sizes, 0.20 mL and 1.00 mL. The application software will provide a user option to select different pipette tip sizes. The 1.00 mL tip will be used in association with the 10.00 mL syringe to transfer and to dilute the samples. When the 0.20 mL pipette tips are sel~ the 0.25 mL syringe should be

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used to transfer the sample from the Cryovial to the deep well plates. The 10.00 mL syringe will be used to add the diluent in the deep wells. Always use the 10.00 mL syringe to wash the cannula regardless the pipette tip sizes.

3. The Capper/Decapper will be controlled separately will provide a "Use Cappermecapper" option.

The application software

:4. Bohdan application software will check the vacuum sensor prior to priming or washing the cannula. If vacuum is not detected, the Workstation will pause the run and display a message box on the screen to ask the operator to click "OK" to continue or "Cancel" to abort the run.

15. The application software will include a "Continue" selection. An incomplete run can be completed later using the "Continue Session" routine.

16. The application software will provide a "Tip Touch" function at deep well plate locations for Sample Transfer processes.

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17. The application software will provide a "Use Liquid Level Sensor" option. If this option is selected, the cannula tip will be moved to the opening of the Cryovial at the Capper/Decapper position, then move downward to search for the liquid level. If the liquid level is equal to or below the "No Spill - Cryovial Safe Height", the cannula will move to the bottom of the vial and aspirate the sample solution. If the liquid level is above the "No Spill - Cryovial Safe Height", the cannula will move downward in a " Cannula Move Increment and drive the syringe in a "Syringe Move Increment" until the "Transfer Volume" is reached or the "No Spill - Cryovial Safe Height" is reached.

18. The application software will include a Password Protection feature to allow for separate accessibility for both users and developers to teaching, method development, system parameters. The storage of the user names and passwords will be in an encrypted file.

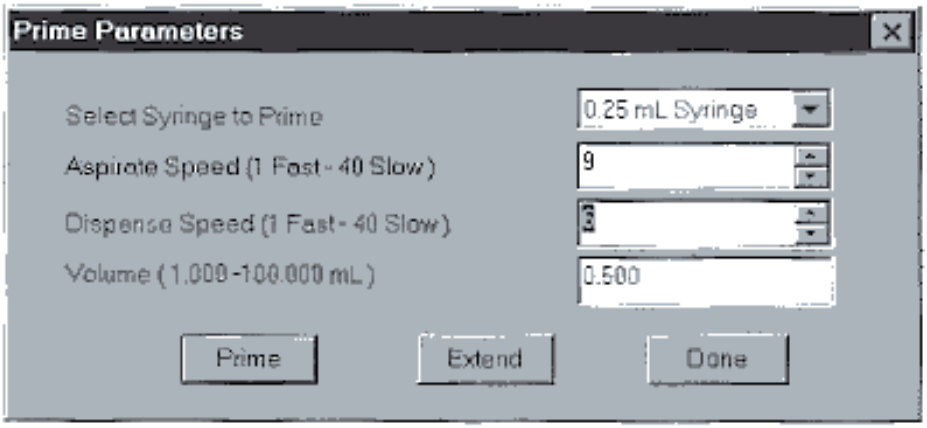
OPERA TOR INPUTS:

Prime Parameters: (Will be used only when priming syringes. These are not used in the Process.)

Label	Limits	Default
Aspiration Speed	1 - 40	SPS*
Dispense Speed	1 - 40	SPS
Prime Volume	1.0 - 100.0 mL	SPS
Syringe Selection		
0.25mL Syringe	List Box	SPS
10.00 mL Syringe	List Box	SPS

*- SPS - Save Previous Settings

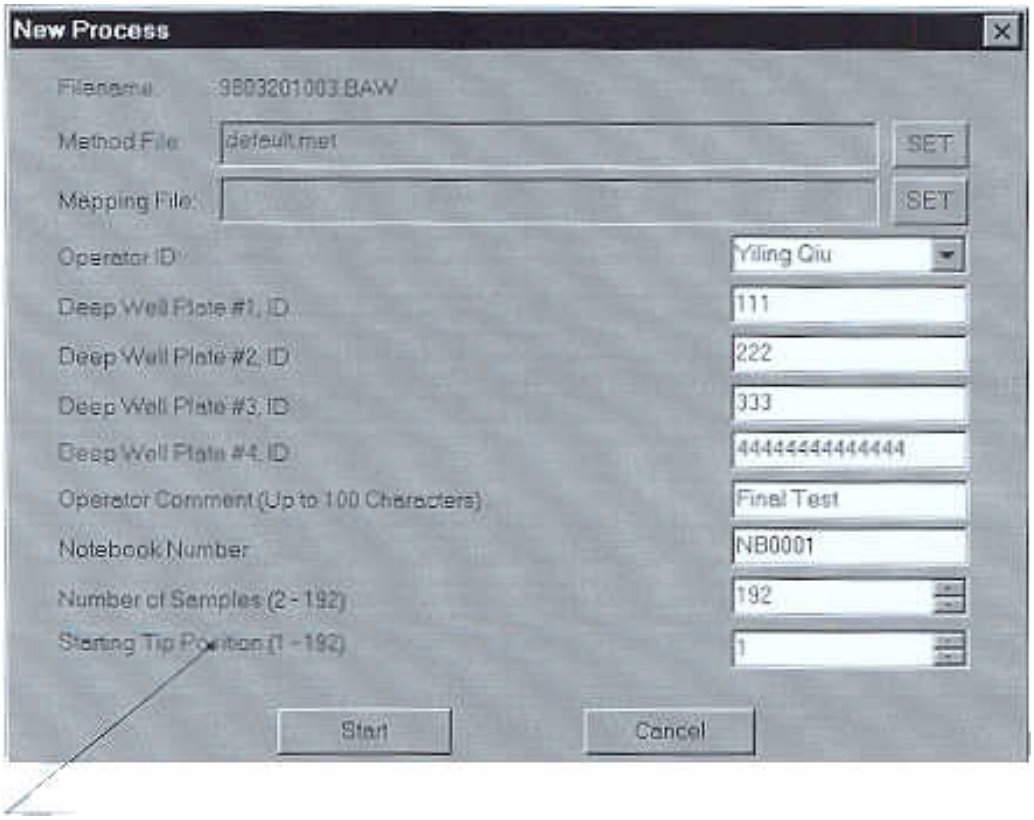
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Run Parameters: (May vary from run to run - even when using the same method) -

Label	Limits/Type	Default
Operator ID	30 Characters	SPS
Deep Well Plate #1, ID	Edit Field	SPS
Deep Well Plate #2, ID	Edit Field	SPS
Deep Well Plate #3, ID	Edit Field	SPS
Deep Well Plate #4, ID	Edit Field	SPS
Operator Comments	Edit Field	SPS
Notebook Number	Edit Field	SPS
Number of Samples To Process	1 - 192	SPS
Starting Tip Position	1 - 192	SPS
Select Method File	File Open Box	SPS
Select Mapping File	File Open Box	SPS



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~ The operator can select any tip position to start a run, after tip position # 192, the Workstation will continue to pick up tip from position #1. It is the operator's responsibility to load the Workstation with the correct type and number of tips prior to start a run. If the pipette tip sensor fails to see a tip attached to the cannula, the Workstation will pause the run and prompt the operator to continue or abort the run.

Unit Parameters: (Will be saved as part of the process file. Unit Parameter is password protected.)

Label

-

Syringe Selection (0.25 or 10.00 niL)
Liquid Transfer Parameters Sample Aspiration Speed Aspiration Delay
Sample Dispense Syringe Speed Sample Dispense Delay
Cannula Wash Parameters Diluent Fill Syringe Speed
Diluent Fill Delay
Diluent Dispense Syringe Speed Diluent Dispense Delay
Cannula Wash Volume
Inner Chamber Waste Drain Time Cannula Soak Time

Limits
List Box

1-40
0-99sec
1 - 40
0-99sec

1-40
0-99sec
1-40
0-99sec
0.250 - 50.000 mL
0-99sec
0-99sec

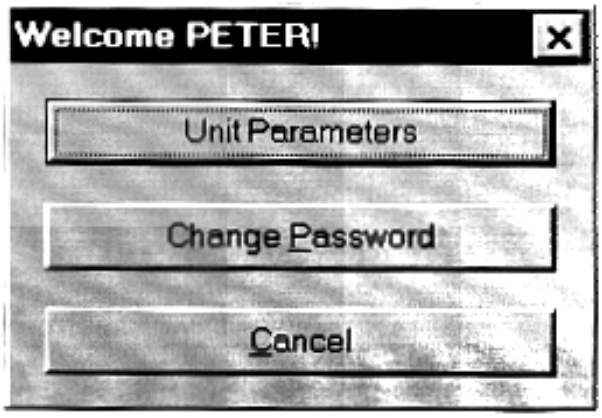
Default
N/A

SPS SPS SPS SPS

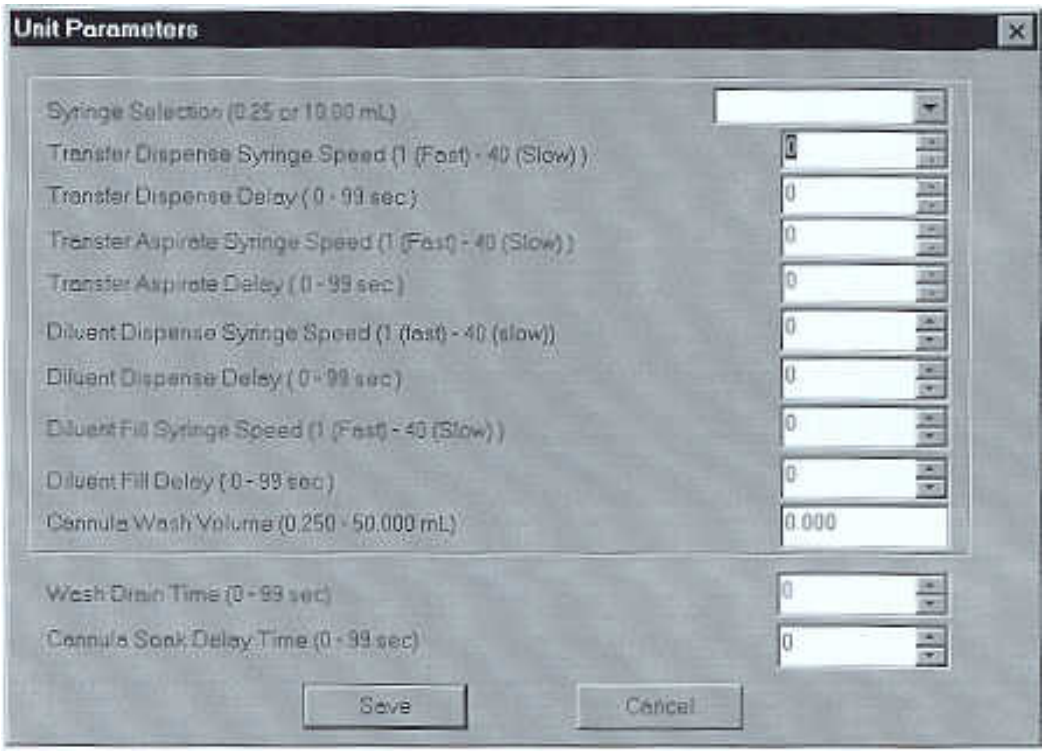
SPS SPS SPS SPS SPS SPS SPS

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Method Parameters: (May be set for each individual method. Unit Parameter is password protected.)

- - -

Label

Method Name

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IU-se- Cap~r7Decapper

Scan Bar Code Option Scan Bar Code Re- **TI**

Limits

-, -- ~
Use Liquid Level Sensor
Cryovial Height (Measured By Steps)
No Spill - Cryovial Safe Height (Measured By Steps)
Cannula Move Increment
~yringe **Move Increment**



-
Limits
File List Box
Check Box
. Check Box
1 - 5
Check Box
0 - 1000 steps
0 - 1000 steps

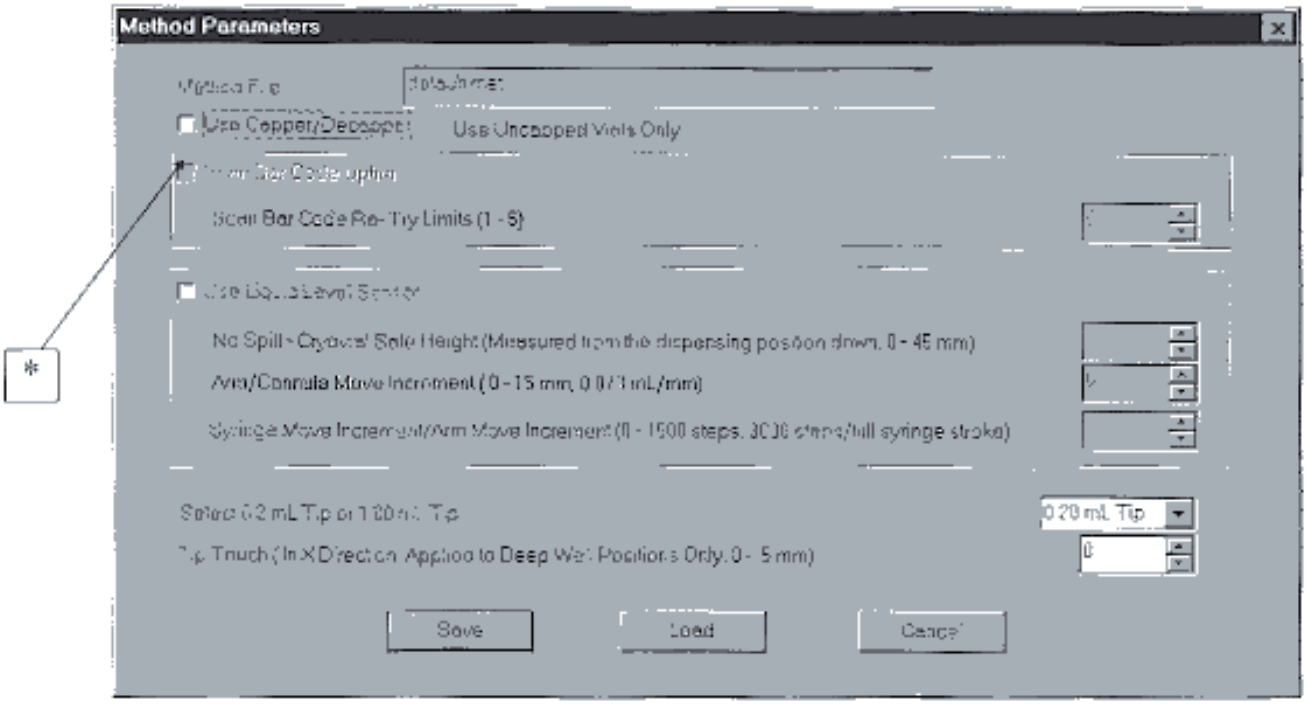
0 -500 steps 0 - 500 steps Radio Button
0 - 50 ~

L!!~~ I
I SPS SPS
ISPS
~PS **SPS**
SPS SPS

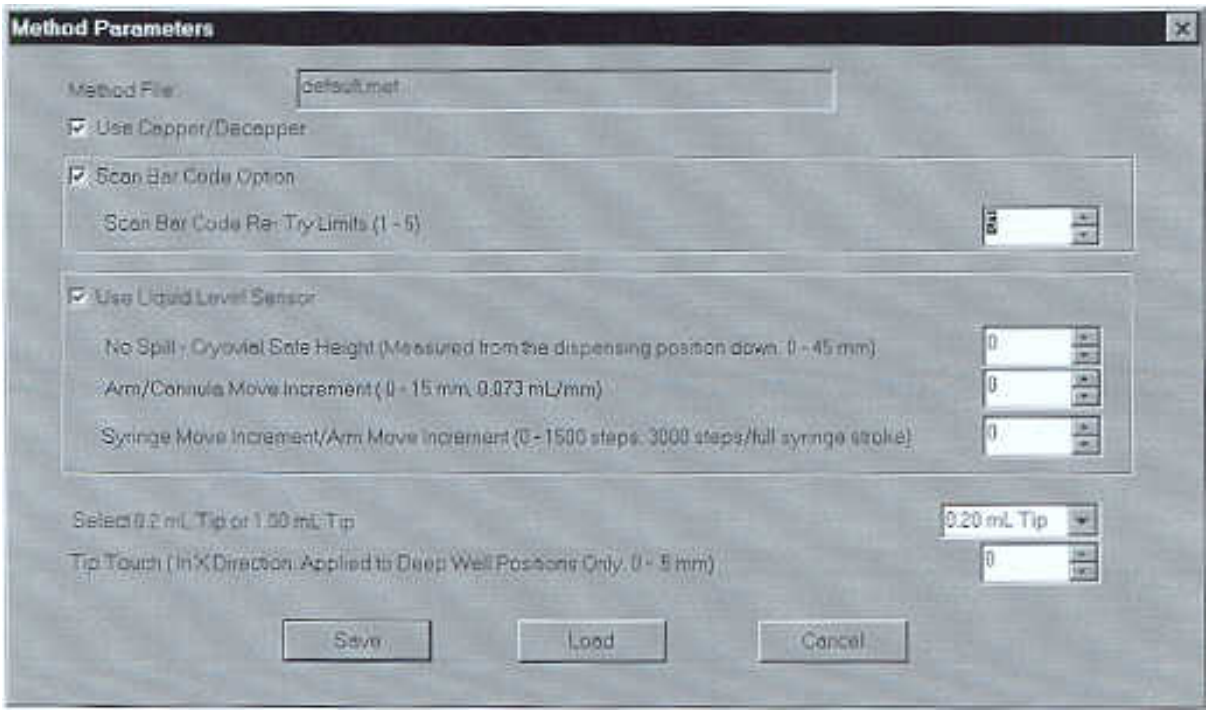
SPS SPS SPS SPS

rti~ T~uc~~ In Zrnrec~on)

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.: When the Capper/Decapper option is not selected, the Scan Bar Code option is not available for use. The Workstation will aspirate sample from sample vials at sample vial rack position.



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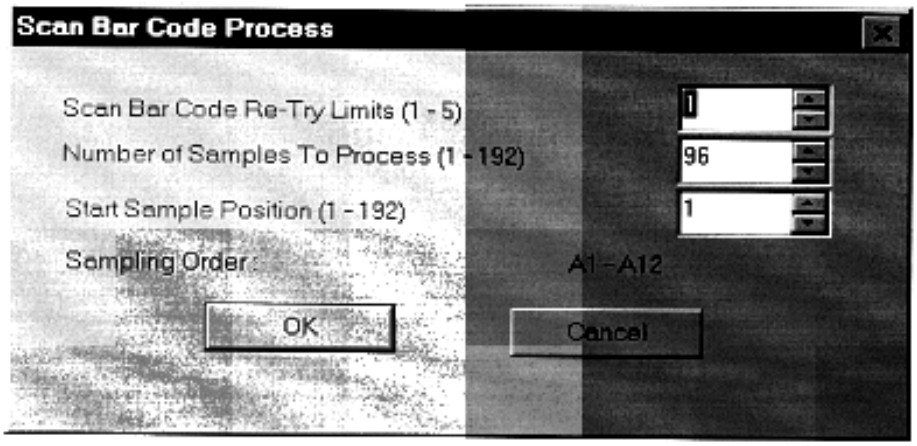
Sub Process Parameters:

Scan Bar Code Mo~ule: (will generate a report for the run.)

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Label	Limits/Type	Default
Scan Bar Code Re-Try Limits	1 - 5	SPS
Number of Samples To Process	1 - 192	SPS
	1 - 192	SPS

I Start Sample Position

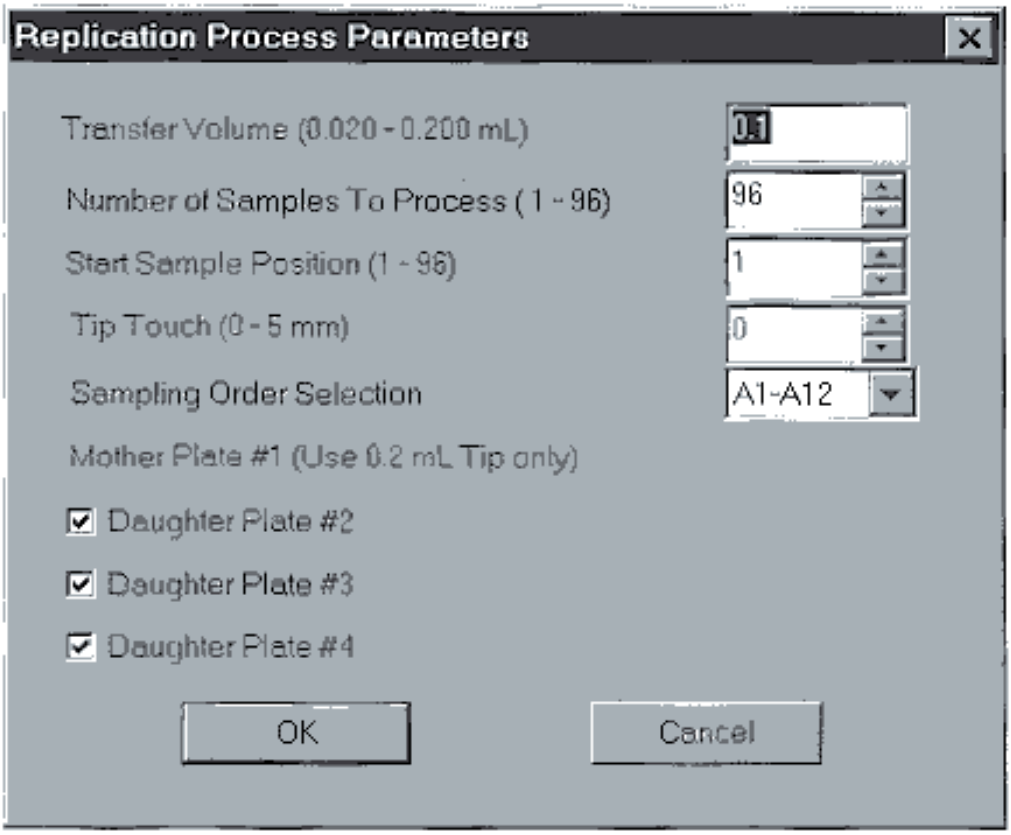


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Replication Module: (This process will take place between the deep well plates. The deep well plate #1 is assigned for the mother plate. Only 0.2 mL tips should be used for the replication process.)

Label	Limits/Type	Default
Select Number of Daughter Plate to Replicate (Up to Three daughter Plates/Module)	Position List Box	SPS
Transfer Volume	0.020 - 0.200 mL	SPS
Number of Samples To Process	1 - 96	SPS
Start Sample Position	1 - 96	SPS
Sample Order Selection: A1 - A12, or A1 - H1	List Box	SPS
Tip Touch (In X Direction)	0 - 5 mm	SPS

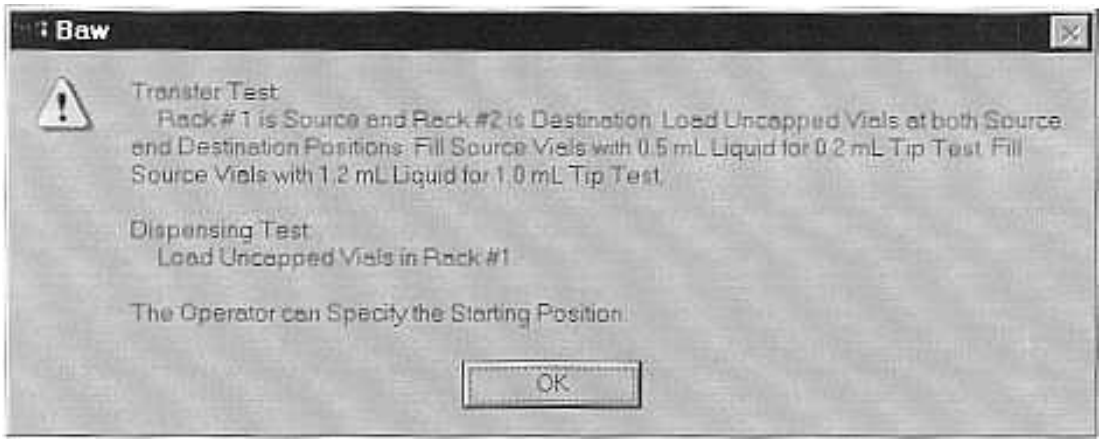
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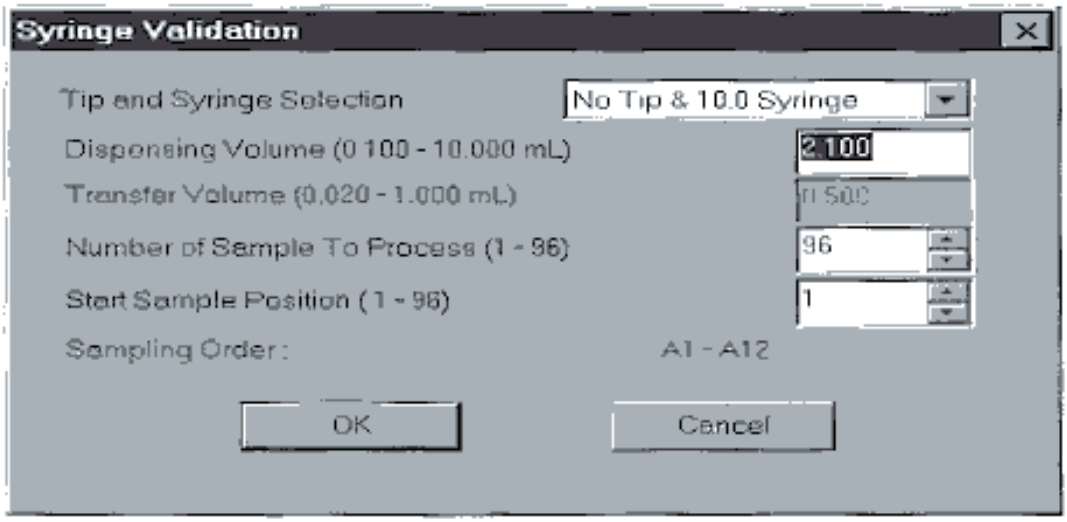
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Syringe Validation Module:

Label	Limits/Type	Default
0.25mL or 10 mL Syringe	Radio Button	SPS
Dispensing Volume	0.10 -10.00 mL	SPS
Pipette Tip	Radio Button	SPS
Transfer Volume	0.02 - 1.00 ml	SPS
Number of Samples To Process	1 - 96	SPS
Start Sample Position	1 - 96	SPS



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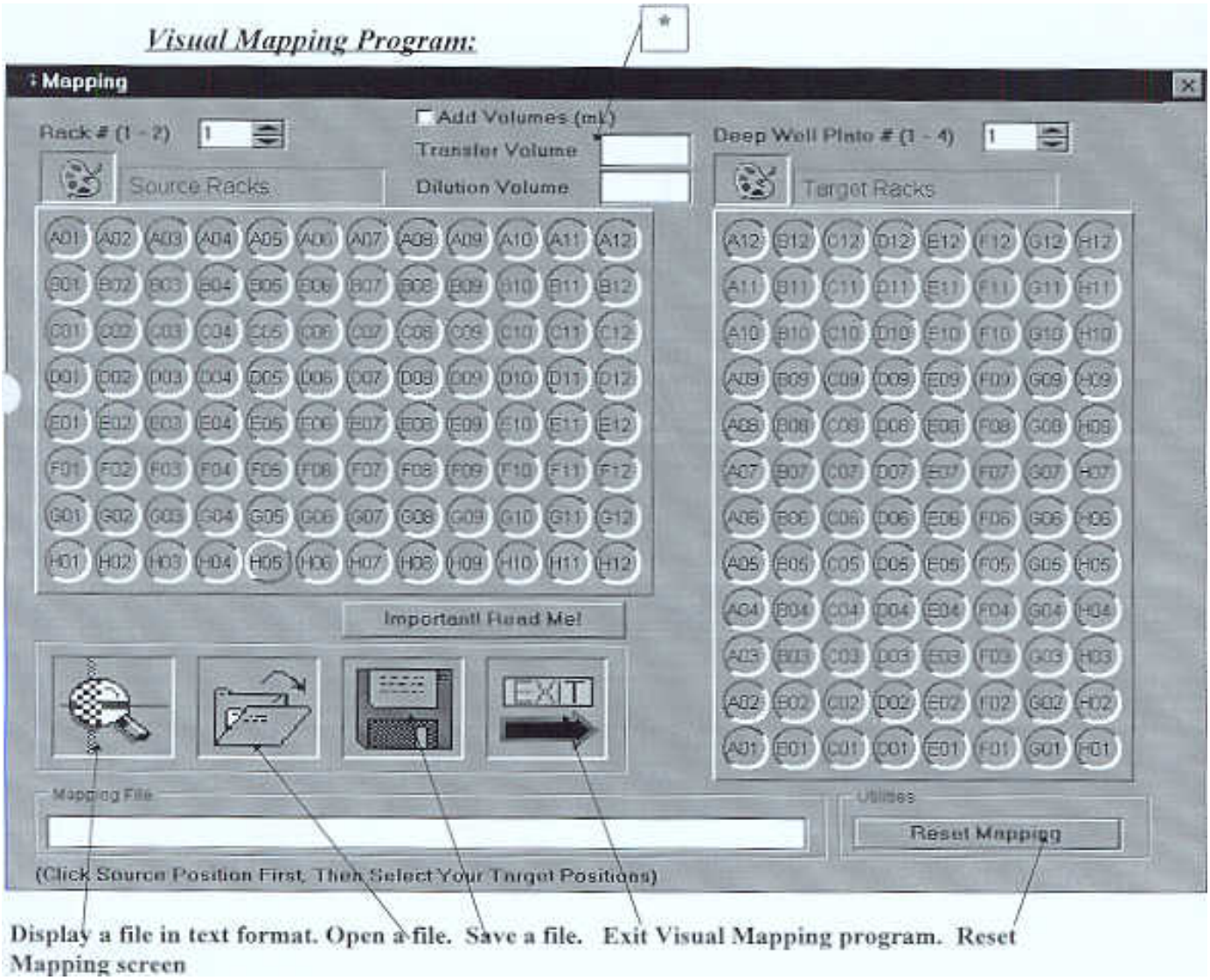
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SOFfW ARE INPUTS:

Sallfllie Ma!,!,ing In_out File Format:

Rack# Cyrovial # Transfer Volume Plate# Well Diluent
(0.05 - 1.00 mL) Position Volume(O - 2.00 mL) 1 A01 0.20 1 A01 0.40
1 A02 0.20 1 A02 0.40
2 B01 0.10 I B01 0.90

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To create a mapping file by using Bohdan Visual Mapping program, simply select a source rack number and a target deep well plate number, then click on the desired source vial position and the target well position.

Any source sample vial position can be chosen as the starting point for a run, all source samples, however, must be run consecutively (without skipping any source sample positions.) All target positions can be chosen randomly.

*

a. b.

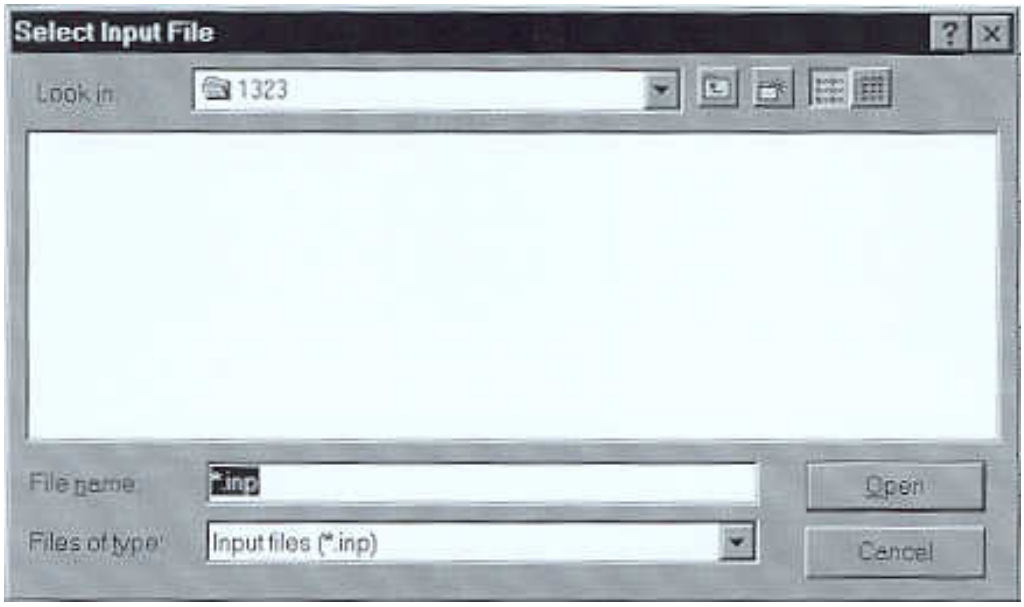
c. d.

e. f.

Check the "Add Volume" check box to apply the "Transfer Volume" and the "Diluent Volume" parameters to the entire file. If the "Transfer Volume" and the "Diluent Volume" needs to be assigned for each source sample, follow the instructions below:

Create a mapping file using the Bohdan Visual Mapping program Go to Bohdan main menu, then Input submenu

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Select the mapping file created by the Bohdan Visual Mapping file
Open the file and modify the "Transfer Volume" and the "Diluent Volume" for each source sample
Save the file with a new name
Don not open the modified mapping files in Bohdan Visual Mapping program

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•

SOFTWARE OUTPUTS:

Run-Time:
At the beginning of the process, prompt the operator:

1. Load the Sample Rack!

2. Fill the Reagent Reservoir!

3

Empty the Waste Reservoir!

During the process, show on screen a frame with the following:

Source Source Sample ID Transfer PlateN Well ## Diluent
Rack Sample # (Bar Code) Volume(mL) Volume(mL)

X

XX

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XXXXXXXX

Prompt the operator.:

1. Computer Beep.

2. **Procedure Completed.**

X.XX

X

XX

. Operator responds by clicking the "OK" Message Box.

PROCESS:

X.XX

Main Process -With "Use CapperlDecapper" And "Scan Bar Code "Options

Operator
I. Load the Workstation with Deep Well Plates and capped Cyrovials.

2. **Prepare Mapping Input** File.

3. **Fill the** Reservoirs.

4. Start the Workstation.

Workstation
Note for software: Check pipette tip size specified in the Method Parameter.
Use the 0.25 mL syringe for 0.2 mL pipette tips, and the 10 mL syringe for 1.0 mL pipette tips!
5. Check vacuum sensor. Ifvacuwn is not detected pause the run and prompt the operator to click "OK" to continue or "Cancel" to abort the run. Wash the cannula with "Wash Volwne" of the solvent. Empty the wash station for "Waste Drain Time". Dispense an additional 1.0 mL of diluent to the wash station and then turn off the vacuwn valve.

6

7

Transfer the first Cyrovial specified by the mapping file to the Turntable and scan the bar code.

Read the vial bar code. If the bar code is confirDled, go to step #8. If the Bar Code Scanner fails to read the bar code for the

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selected number of "Bar Code Scanner Re-Try Limit", continue the process. Flag the results in the report and the Run - Time InforDlation screen.

8. Move the first Cryovial from Turntable to the Capper/Decapper and immediately start the capping/decapping process.

9.

Transfer the second Cyrovial to the Turntable.

10. Move the cannula to the "Starting Tip Position" of the Pipette Tip Rack and pick up the pipette tip.

1. Move the arD1 to the Pipette Tip Sensor position to conf1m1 the actual picking up of the tip. If a tip is detected, go to step # 13. If the sensor fails to detect the tip, repeat step # 10 at same position. If the sensor fails to detect the tip again, display an error message on the screen. The operator must attach a pipette tip to the cannula manually, correct the situation and click "OK" to continue, or "Cancel" to abort the run.

12. Repeat step #11 if the operator chooses to continue the run.

13. If "Use Liquid Level Sensor" option is not selected, move the ann to the aspiration position (bottom of the vial) of the first uncapped source Cyrovial

14. If "Use Liquid Level Sensor" option is selected, move the arm to the opening of uncapped Cyrovial. Then move the cannula downward to search the liquid level. If the liquid level is equal to or below the "No Spill- Cryovial Safe Height", the cannula will move to the bottom of the vial. If the liquid level is above the "No Spill - Cryovial Safe Height", the cannula will move downward in a " Cannula Move Increment" and drive the syringe in a "Syringe Move Increment" until the desired volume is reached or the "No Spill - Cryovial Safe Height" is reached. Note: If the liquid level is not found, skip to step #19 and flag the results in the report and on the Run -Time screen.

15. Aspirate the "Transfer Volume per Well x Number of Target Wells" of the sample solution (The "Transfer Volume per Well x Number of Target Wells" must be ~ selected tip size).

16. Dispense "Transfer Volume" of the sample solution into the first target well specified by the mapping file. Apply the "Tip Touch" function if applicable The "Transfer Volume" can be selected for each deep well.

17. Repeat step # 16 if multiple target wells are specified for the first source Cryovial

18. Repeat steps #13 - #17 if the "Transfer Volume per Well x Number of Target
Wells" is ;?; the selected tip size.

19. Start capping the vial

20. Move the arm to the Pipette Tip Shucker and remove the tip.

21. Move the arm *to* the Pipette Tip Sensor position to confirm the actual removal *of* the tip. If the tip is not detected by the sensor, skip to step #23. If the tip is
detected by the sensor, repeat step #20. If the tip is detected by the sensor again, pause the run and prompt the operator. The operator must remove the pipette tip
from the cannula, correct the situation and click "OK" to continue, or "Cancel" to abort the nIn.

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22. Repeat step #21 if the operator choose to continue the run.

23. Transfer the first Cryovial from the Capper/Decapper to the Pedestal.

24. Repeat step #7 to scan the bar code for the second Cryovial

25. Transfer the second Cryovial from the Turntable to the Capper/Decapper, and start capping/decapping process.

26. Return the first Cryovial from the pedestal to its original position.

27. Repeat steps #9 - #25 for the remaining "Number of Samples'

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28. **Repeat step #5 to wash the cannula**

29. **Aspirate 10 mL diluent from the** reservoir.

30. Sort target well dispensing sequence according to the target well locations. Dispense specified "Diluent Volume" into the well which has lowest well
number and deep well plate number.

31. The "Diluent Volume" can be selected for each well, repeat step #29 until the syringe is empty or all wells for the entire run are processed.

32. Repeat step #28 - #31 if more diluent is needed for the remmning wells.

33. Discard excess diluent and repeat step #5 to wash the cannula.

34. Beep and display message box to signal the operator that the run is complete.

35. Generate and store the **report** in a file labeled *mmddhhmm.rpt.*

Main Process - With "Use *CapperlDeca_Dper" Option*

Uperator
1. Load the Workstation with Deep Well Plates and capped Cyrovials.

2

3

4,

Prepare Mapping Input File

Fill the Reservoirs

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Start the Workstation

Workstation

Note for software: Check the pipette tip size specified in the Method Parameter. Use the 0.25 mL syringe for 0.2 mL pipette tips and the 10 mL syringe for 1.0 mL pipette tips!

5. Check vacuum sensor. If vacuum is not detected pause the run and prompt the operator to click "OK" to continue or "Cancel" to abort the run. Wash the cannula with "Wash Volume" of the solvent. Empty the wash station for "Waste Drain Time". Dispense an additiona1I.0 mL of diluent to the wash station and then turn off the vacuum valve.

6,

7

Transfer the first Cyrovial specified by the mapping file to the Capper/Decapper and immediately start capping/decapping process.

Move the cannula to the "Starting Tip Position" of the Pipette Tip Rack and pick up the pipette tip.

8. Move the arm to the Pipette Tip Sensor position to confirm the actual picking up of the tip. If a tip is detected, go to step #10. If the sensor fails to detect the tip, repeat step #7 at same tip position. If the sensor fails to detect the tip again, pause the run and prompt the operator. The operator must attach a pipette tip to the cannula manually, correct the situation and click "OK" to continue, or "Cancel"
to abort the run.

9.

Repeat step #8 if the operator chooses to continue the run..

to. If "Use Liquid Level Sensor" option is not selected, move the ann to the aspiration position (bottom of the vial) of the first uncapped source Cyrovial.

11. If "Use Liquid Level Sensor" option is selected, move the arm to the opening of uncapped Cyrovial. Then move the cannula downward to search the liquid level. If the liquid level is equal to or below the "No Spill- Cryovial Safe Height", the cannula will move to the bottom of the vial. If the liquid level is above the "No Spill - Cryovial Safe Height", the cannula will move downward in a " Cannula Move Increment" and drive the syringe in a "Syringe Move Increment" until the desired volume is reached or the "No Spill - Cryovial Safe Height" is reached. Note: If the liquid level is not found, skip to step #16 and flag the results in the report and on the Run -Time screen.

12. Aspirate the "Transfer Volume per Well x Number of Target Wells" of the sample solution (The "Transfer Volume per Well x Number of Target Wells" must be ~ selected tip size).

13. Dispense "Transfer Volume" of the sample solution into the first target well specified by the mapping file. Apply the "Tip Touch" function if applicable.

14. The "Transfer Volume" can be selected for each deep well. Repeat step #13 if multiple target wells are specified for the fIrSt source Cryovial.

15. Repeat steps #10 - #14 if the "Transfer Volume per Well x Number of Target Wells" is ? the selected tip size.

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16. Start capping the vial.

17. Move the arm to the Pipette Tip Shucker and remove the tip.

18. Move the arm to the Pipette Tip Sensor position to conflrnl the actual removal of the tip. If the tip is not detected by the sensor, skip to step #20. If the tip is detected by the sensor, repeat step # 17. If the tip is detected by the sensor again, pause the run and prompt the operator. The operator must remove the pipette tip from the cannula, correct the situation and click "OK" to continue, or "Cancel" to abort the run.

19. Repeat step # 18 if the operator chooses to continue the run.

20. Transfer the vial from the Capper/Decapper to its original position.

21. Repeat steps #6 - #20 for the remaining "Number of Samples" to process.

22. Repeat step #5 to wash the cannula,

23. Aspirate 10 mL diluent from the reservoir.

24. Sort target well dispensing sequence according to the target well locations. Dispense specified "Diluent Volume" into the well which has lowest well
number and deep well plate number.

25. The "Diluent Volume" is selectable for each well, repeat step #24 until the syringe is empty or all wells for the entire run are processed.

26. Repeat step #23 - #25 if more diluent is needed for the remaining wells.

27. Discard excess diluent and repeat step #5 to wash the cannula.

28. Beep and display message box to signal the operator that the run is complete.

29. Generate and store the report in a file labeled *mmddhhmm.rpt.*

*Main Process - **Without** "Use Ca_DperlDecapper" And "Scan Bar Code "Qjltions*

Operator

1. Load the Workstation with Deep Well Plates and uncapped Cyrovials.

2. Prepare Mapping **Input** File.

3. **Fill the** Reservoirs.

4. Start the Workstation.

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Workstation

Note: Check the pipette tip size specified in the method Parameter. Use the 0.25 mL syringe for 0.2 mL pipette tips and the 10 mL syringe for 1.0 mL pipette tips!
5. Check vacuum sensor. If vacuum is not detected pause the run and prompt the operator to click "OK" to continue or "Cancel" to abort. Wash the cannula with "Wash Volume" of the solvent. Empty the wash station for "Waste Drain Time". Dispense an additional 1.0 mL of diluent to the wash station and then turn off the vacuum valve.

6.

7.

8

9.

Move the cannula to the "Starting Tip Position" of the Pipette Tip Rack and pick up the pipette tip.

Move the arm to the Pipette Tip Sensor position to confirm the actual picking up of the tip. If a tip is detected, go to step #9. If the sensor fails to detect the tip, repeat step #6 at same tip position. If the sensor fails to detect the tip again, pause the run and prompt the operator. The operator must attach a pipette tip to the cannula manually, correct the situation and click "OK" to continue, or "Cancel"
to abort the run.

Repeat step #7 if the operator chooses to continue the run.

If "Use Liquid Level Sensor" option is not selected, move the arm to the aspiration position (bottom of the vial) of the first uncapped source Cyrovial at the vial rack position.

10. If "Use Liquid Level Sensor" option is selected, move the arm to the opening of uncapped Cyrovial at the vial rack position. Then move the cannula downward to search the liquid level. If the liquid level is equal to or below the "No Spill- Cryovial Safe Height", the cannula will move to the bottom of the vial. If the liquid level is above the "No Spill - Cryovial Safe Height", the cannula will move downward in a " Cannula Move Increment" and drive the syringe in a "Syringe Move Increment" until the desired volume is reached or the "No Spill - Cryovial Safe Height" is reached. Note: If the liquid level is not found, skip to step #15 and flag the results in the report and on the Run -Time screen.

11. Aspirate the "Transfer Volume per Well x Number of Target Wells" of the sample solution (The "Transfer Volume per Well x Number of Target Wells" must be ~ selected tip size).

12. Dispense "Transfer Volume" of the sample solution into the first target well specified by the mapping file. Apply the "Tip Touch" function if applicable.

13. The "Transfer Volume" can be selected for each deep well. Repeat step #12 if multiple target wells are specified for the fIrst source Cryovial.

14. Repeat steps #9 - #13 if the "Transfer Volume per Well x Number of Target Wells" is ~ the selected tip size.

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15. Move the ann to the Pipette Tip Shucker and remove the tip.

16. Move the arm to the Pipette Tip Sensor position to confirm the actual removal of the tip. If the tip is not detected by the sensor, skip to step #18. If the tip is detected by the sensor, repeat step # 15. If the tip is detected by the sensor again, pause the run and prompt the operator. The operator must remove the pipette tip from the cannula, correct the situation and click "OK" to continue, or "Cancel" to abort the run.

1 7. Repeat step # 16 if the operator chooses to continue the run.

18. Repeat steps #6 - # 17 for the remaining "Number of Samples" to process.

19. Repeat step #5 to wash the cannula.

20. Aspirate 10 rnL diluent from the reservoir.

21. Sort target well dispensing sequence according to the target well locations. Dispense specified "Diluent Volume" into the well which has lowest well
number and deep well plate number.

22. The "Diluent Volume" can be selected for each well, repeat step #21 until the syringe is empty or all wells for the entire run are processed.

23. Repeat step #20 - #22 if more diluent is needed for the remaining wells.

24. Discard excess diluent and repeat step #5 to wash the cannula.

25. Beep and display message box to signal the operator that the run is complete.

26. Generate and store the report in a file labeled *mmddhhmm.rpt.*

Sub-Processes:

Scan Bar Code
Operator
1. Load the Workstation with capped vials.

2. Start the Workstation.

Workstation
3. Move the grippers to "Start Sample Position" and transfer the vial to the Turntable.

4.

5.

Read the vial bar code: If the bar code is confirmed, go to step #5. If the Bar Code Scanner fails to read the bar code for the selected number of "Bar Code Scanner Re-Try Limit", pause the run and show a message box on the screen. The operator will

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remove the failed vial, check the system, place a new vial in the original position of the rack and click "OK" in the message box. The A WS will then repeat steps #3 - #4.

Return the vial to its original location.

6. Repeat Steps #3 - #5 for "Number of Samples".

7. Beep and display message box to signal the operator that the run is complete.

8.

Generate and store the report in a file labeled *mmddhhmm.rpt*

Replication
Operator
1. Load the Workstation with Deep Well Plates and 0.2 mL Pipette Tips.

2.

3.

4.

Prepare a Mother Plate.

Fill the Reservoirs.

Start the Workstation.

Workstation
Notes for software: Use the 0.25 mL syringe and 0.2 mL pipette tips only!
The Liquid Level Sensor will not be used in this process. It is the operator's responsibility to ensure that each well is filled ~ 80% of its capacity.
5. Check vacuum sensor. If vacuum is not detected pause the run and prompt the operator to click "OK" to continue or "Cancel" to abort. Wash the cannula with "Wash Volume" of the solvent. Empty the wash station for "Waste Drain Time". Dispense an additional 1.0 mL of diluent to the wash station and then turn off the vacuum valve.

6.

7.

8.

Move the cannula to the Pipette Tip Rack # 1 and pick up the pipette tip # 1

Move the arm to the Pipette Tip Sensor position to confmn the actual picking up of the tip. If a tip is detected, go to step #9. If the sensor fails to detect the tip, repeat step #6. If the sensor fails to detect the tip again, display an error message on the screen. The operator must attach a pipette tip to the cannula manually, correct the situation and click "OK" to continue, or "Cancel" to abort the run.

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Repeat step #7 if the operator chooses to continue the run.

9.

Move the arm to "Start Sample Position" of the mother plate. Move the cannula to the aspiration position of the well, and aspirate the "Total Transfer Volume" of the sample solution up to 0.200 mL. Note: "Total Transfer Volume" = 1, or ,2 or 3 x "Transfer Volume" based on the number of daughter plates selected.

10. Dispense the "Transfer Volume" of the sample solution into the corresponding well of the first daughter plate. Apply the "Tip Touch" function if applicable.

11. Repeat step # 10 if multiple daughter plates are specified.

12. Repeat steps #9 - #11 if the total volume is > the tip size (0.200 mL).

13. Move the ann to the Pipette Tip Shucker and remove the tip.

14. Move the arm to Pipette Tip Sensor position to confinn the actual removal of the tip. If the tip is not detected by the sensor, skip to step #16. If the tip is detected by the sensor, repeat step # 13. If the tip is detected again by the sensor, display a error message on the screen. The operator must remove the pipette tip from the cannula, correct the situation and click "OK" to continue, or "Cancel" to abort the run.

15. Repeat step # **14** if the operator chooses to continue the run.

16. Repeat steps #6 - #15 for the remaining "Number of Samples".

17. Repeat step #5 to wash the cannula.

18. Beep and display message box to signal the operator that the run is complete.

19. Generate and store the report in a file labeled *mmddhhmm. rpt.*

~vringe ***Validation -10*** *ml ~vringe* ***DispensingfNo Pipette*** *Tip~)* **Operator**
1. Load the Workstation with **uncapped and pre-weighed** Cyrovials.

2.

3,

Fill the Reservoir.

Empty the Waste Reservoir.

4. **Start the run.**

file:///C|/DOCUME~1/markun/LOCALS~1/Temp/~LWF0000.htm (44 of 106)9/29/2004 12:01:21 PM
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Workstation
5. Check Vacuum Sensor, if vacuum is not detected pause the run and show a message box on the screen. The operator must click "OK" to continue or "Cancel" to abort the run. Wash the cannula using selected "Wash Parameters" and empty the Wash Station for "Waste Drain Time". Dispense an additiona11.0 mL of diluent to the wash station and then turn off the vacuum valve.

6. Aspirate "Dispensing Volume" of the solution from the reservoir.

1.

8.

9.

Dispense the liquid into the Cyrovial # 1

Repeat steps #6- #7 for the "Number of Samples".

Provide a "Run Complete" user prompt.

10. Generate and store the report in a file labeled *mmddhhmm. val.*

~~"':H,.n J/nJ:Jnl':nH - T..nHcol"n.. U7:I'J. /) ? ...T *n*.. 1 */)...T D:nnl'l'n* T:nco

""_lIr5'5&~ ,. ..55 55V'5 ▀▁ .a, "'5~-,~' ,,,. 55'5 V.~ ,,~ V, .a.V ,,~ .a 5!,~55~ .a *5_U*~

Operator
1. Load the Workstation with uncapped and pre-weighed Cyrovials in Vial Rack #2, starting from "Start Sample Position" to "Number of Samples to Process". Place uncapped and filled Cyrovials in Vial Rack #1., starting from "Start Sample Position" to "Number of Samples to Process". Load correct pipette tips in pipette tip #1., starting from position #1. to "Number of Samples to Process".

2

3

4.

Fill the Reservoir.

Empty the Waste Reservoir.

Start the run.

Workstation
Note for Software: Check the pipette tip size specified in the Syringe
Validation Parameter. Use the 0.25 mL syringe for 0.2 mL pipette tips and
the 10 mL syringe for 1.0 mL pipette tips!
5. Check Vacuum Sensor, if Vacuum is not detected pause the run and show a message box on the screen. The operator must click "OK" to continue or "Cancel" to abort the run. Wash the cannula using selected "Wash Parameters" and empty the Wash Station for "Waste Drain Time". Dispense an additional 1.0 mL of diluent to the wash station and then turn off the vacuum valve.

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6.

Move the arm to the Pipette Tip Rack #1 and pick up Pipette Tip #1

7.

Move the arm to the Pipette Tip Sensor position to confirm the actual picking up of the tip. If a tip is detected, go to step #9. If the sensor fails to detect the tip, repeat step #6. If the sensor fails to detect the tip again, display an error message on the screen. The operator must attach a pipette tip to the cannula manually, correct the situation and click "OK" to continue, or "Cancel" to abort the run.

8. Repeat step #7 if the operator chooses to continue the run.

9.

Aspirate the "Transfer Volume" of the solution from the filled source vial in Rack #1.

10. Dispense the liquid into the pre-weighed Cyrovial #1 at Rack #2.

11. Apply the "Tip Touch".

12. Move the arm to the Pipette Tip Shucker and remove the tip.

13. Move the arm to the Pipette Tip Sensor position to confirm the actual removal of the tip. If the tip is not detected by the sensor, skip to step #15. If the tip is detected by the sensor, repeat step #12. If the tip is detected by the sensor again, display an error message on the screen. The operator must remove the pipette tip from the cannula, correct the situation and click "OK" to continue, or "Cancel" to abort the run.

14. Repeat step #13 if the operator chooses to continue the run.

15. Repeat steps #6 - #14 for the remaining "Number of Samples".

16. Repeat step #5 to wash the cannula.

17. Provide a "Run Complete" user prompt.

18. Generate and store the report in a file labeled *mmddhhmm.val.*

Wash Cannula

1. Turn on the wash station outer chamber vacuum valve.

2.

Move the arm to the wash station outer chamber and dispense the waste.

3. Move the arnl to the wash station inner chamber, aspirate solvent from reservoir and dispense the solvent.

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4. Turn off the wash station outer chamber vacuum valve.

5.

Wait for the "Cannula Soaking Time'

6.

7.

8.

9.

Turn on the wash station inner chamber vacuum valve for selected "Waste Drain Time".

Aspirate 1.0 mL diluent from the reservoir (use 10 mL syringe for this application).

Dispense the diluent into the wash station inner chamber.

Lift cannula up.

10. Turn off the wash station inner chamber vacuum valve.

Requirements for File Exchange:

(1)

(2)

Root Directory

Executable Files

C:\BOHDAN

C:\BOHDAN\BA W.EXE

Filename	Description
MMDDHHmm . BAW	Process control file
MMDDHHmm . RPT	Process Report file
MMDDHHmm . VAL	Syringe Validation Report file
xxxxxxxx . INP	Input data tables

Reports:
Final Report Format:

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Bohdan Automated Liquid Pipetting Workstation

Company Information

"Run Start Date"
"Run Start Time"
Parameters
Sample Mapping Input File Name

Source Source Sample ID Transfer Plate# WeU# Diluent
Rack Sample # (Bar Code) Volume(mL) Volume(mL)

X

:xx

xxxxxxxx

x.xx

X

XX

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X.XX

AUX Functions:

_____1. Check Liquid Level Sensor

2. **Check Pipette Tip Sensor**

3. **Check Vacuum**

4.

Test Capper/Decapper

5. **Read Bar Code**

6. **Home Arm**

7. Gripper Open/Close

8.

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9.

Canuula Up/Down

Remove Large Tip

10. Remove Small Tip

11. Change Tip

Bohdan Testing Criteria:

1. Run a full rack of samples and verify proper operation and report fonnat.

2. Run Syringe Validation program and generate a report.

3. Run Bohdan Visual Mapping Program to verify proper operation.

Additional Customer Requirements:

1

Use a smart Capper/Decapper module.

2. For the dilution range 1: 1 0 to 1 :50 with maximum volume of 2mL, the system will have the capability to pipette and dispense liquid with :

Accuracy: Relative Error ~ 6% of delivery volume.

Precision: CV = ::t: 3% of delivery volume.

4.

The temperature for all chilled racks should be controlled within 4°C f: 3 °c.

Documentation:

Manual.

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Installation:

The Workstations will be installed by the Bohdan Service Engineer.

Definitions:

Application: The software for individual procedures to be used by the Workstation. An Application may include multiple processes or may be a single process to be performed by the Workstation such as "Teach" or "Tare." Each separate Application is represented by an icon (picture) in the Bohdan Automated Workstation Window Group.

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2. Aspirate Delay: The time for which the syringe will pause after aspiration before moving to the next process step. This setting can be changed to accommodate solvent viscosity .

3. Aspirate Speed: The speed at which the syringe draws up liquid. A setting of 40 is the slowest possible speed and a setting of 1 is the fastest. The setting will vary depending upon solvent type and syringe size.

4.

5

6.

7.

AUX: A group of functions that allow the user to manually control the Workstation apart from a run for troubleshooting and/or setup.

A WS: Automated Workstation.

Check Box: A box with a text label. Clicking the square activates or deactivates the action. A checked box causes the defined action to occur. Multiple check boxes may be activated or some may be mutually exclusive.

Combo Box: A combination of an Edit Field and Selection Box. With it, the user can select an item from a list and place that item into the edit field or manually type in the text.

8. Dispense Delay: The time for which the syringe will pause after dispensing before moving to the next process step. This setting can alter dispensing accuracy and preCISIon.

9.

Dispense Speed: The speed at which the syringe pushes out liquid. A setting of 40 is the slowest possible speed and a setting of I is the fastest. The setting will vary depending upon solvent type and syringe size.

10. **Edit Field:** A box in which a user can enter text. A Numeric Edit Field also has scroll (up/down) buttons.

11. **Exception/Decisions:** Specific exceptions or decisions that the software needs to make are outlined here with all possible options.

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12. **Fluid Flow Diagram:** A diagram showing the solvent path including tubing sizes, sample loops if any, and other information needed for Workstation plumbing.

13. **Help:** The Help window displays the current version number of the software and the address and phone number where help and/or service may be obtained.

14. **Method Parameter:** A parameter saved in a specific method. Several methods may exist and multiple methods may be used in a single run for separate samples if required. The method(s) to be used is(are) selected for a specific run. Multiple methods may be saved and reused.

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15. **Prime Parameter:** A parameter to be used only for the priming sequence. The priming sequence is used to fill the solvent lines with the solvent to be used in the current run.

16. **Procedure:** The set of laboratory techniques that the Workstation is to perform (i.e. GC Sample Preparation).

17. Process Parameter: The area where the specific Process to be performed, in this run, is defined. There are two subtypes: New and Continue. New is used the first time a given group of samples is to be run. Continue is used if a run of a given set of samples was interrupted and is to be continued from where it stopped.

18. Process: The subset of steps that the Workstation is to perform (i.e., Taring,
Dilution, Filtration, etc.). There may be multiple Processes on a Workstation.

19. **Radio Buttons:** A small circle with text description. It is only used for a group in which only one item at a time may be selected.

20. **Report:** The area where previously generated reports may be viewed and/or printed.

21. **Run Parameter:** A parameter required for an individual run. or may not vary from run to run using the same method.

These parameters may

22. Sample Loop: The liquid capacity of the tubing between the cannula and the syringe. This tubing is used to isolate the syringe from the samples so that samples never reach the syringe.

23. Sample Parameters: A parameter that can be entered for each individual sample.

24. Selection Box: A box with a pull down menu. It displays a list of strings, such as file names and can not be edited.

25. **SPS:** Save previous settings.
the previous setting used.

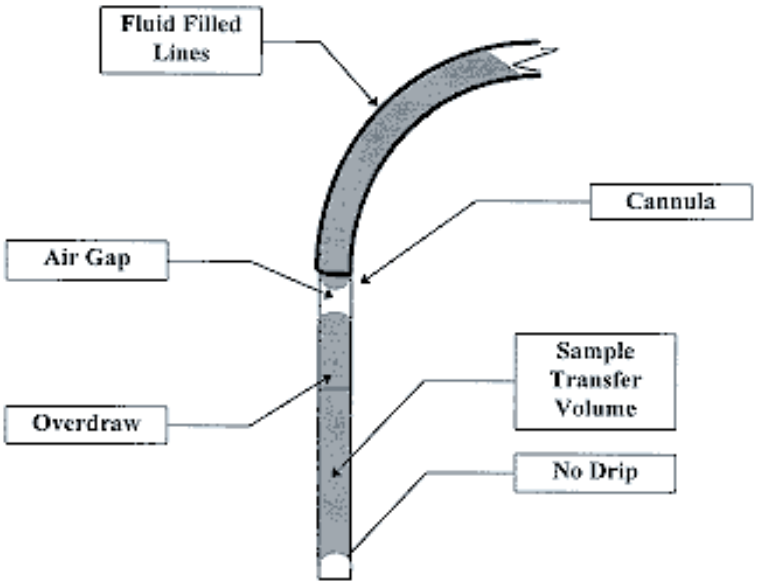
The next time the field is accessed the default will be

26. **Teach:** The Application to be used to teach the locations on the Workstation. This
program needs to be run periodically (especially if Workstation has been serviced or moved) to verify exact locations of components (i.e., balance, samples, wash station, etc.).

27. Unit Parameter: A parameter which will rarely be changed. It is used regardless of the method selected. This parameter needs to be input only when a change is desired. Only one set of Unit Parameters may exist at a time in each Application.

28. **Wash Drain Time:** Time selected to leave valve on for draining the inside and outside chamber of the Wash Station.

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1

2.

3.

4.

5.

Air Gap: The volume of air used to separate the sample transferred from the solvent in the fluid filled lines. Only used for transfer, this feature is not active when dispensing from the reservoir. Used in combination with the overdraw, this minimizes dilution effect in the lines (See ~so Number 34).

Cannula: The metal, plastic, or other material part of the fluid transfer system that would be equivalent to a syringe "needle." The cannula may be either fixed or transportable(See also Number 34).

Fluid Filled Lines: The lines connecting the reservoir to the syringe and the cannula. These lines must be filled with fluid at all times to maintain dispensing/transfer accuracy (See also Number 34).

No Drip: The volume of air aspirated after all other materials to minimize the potential for dripping (See also Number 34).

Overdraw: The volume of aspirated material, in addition to the sample, used to separate the sample to be dispensed from the solvent in the fluid filled lines. Only used for transfer, this feature is not active when dispensing from the reservoir. Used in combination with the air gap, this minimizes dilution effect in the lines (See also Number 34).

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FLillD FLOW DIAGRAM

(1) No Sample Loops!!
(2) Tubing must be as short as possible!!

10 mL

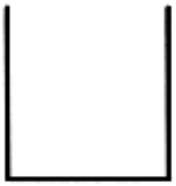
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0.25 **mL**

O.O61D Tubing



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Reservoir

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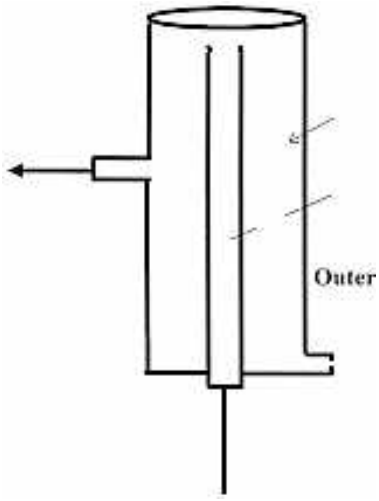
To Solvent
Reservoir
0.06 ID
Tubing

WASTE FLUID FLOW DIAGRAM

Wash Station

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Overflow

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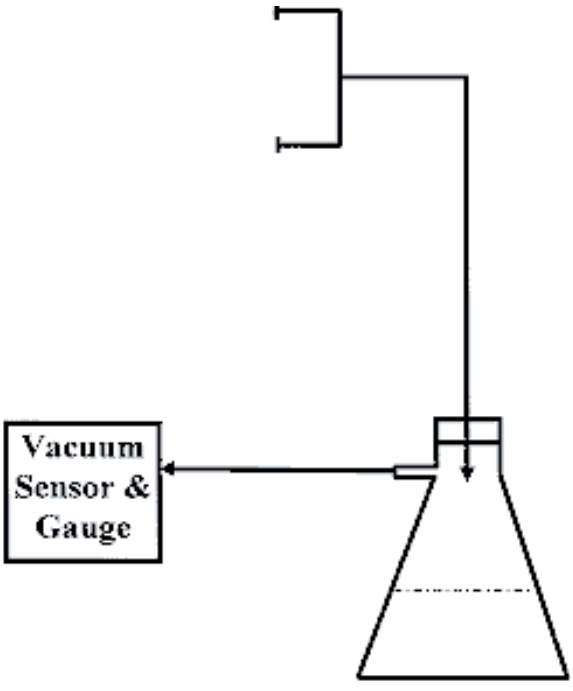
Outer Chamber
_/

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Inner Chamber
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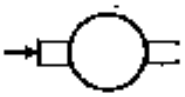
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~LWF0000

Chamber Drainage 2-Way Valve



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Inner Chamber Drainage
2-Way Valve

To Vacuum

s.;~~):J-

Main Vacuum Valve
2-Way

4 L Vacuum Flask

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SECTION 3 : SPECIFICATIONS

CONTENTS

Section

3.1 Workstation Specifications

3.2 **Workstation Components**

3.3 **Docwnentation.**

3.4 **Computer** Specifications

3.5 **Printer** Specifications.,

3.6 **Software Specifications** '

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Workstation Specifications

Movement Repeatability: +/-0.010" Minimum Movement: 0.020" (in each axis) Maximum Stroke Travel: (XL)
X = 36" Y = II" Z = II"

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(STD)
18" 11 " 11 "

Gripper Fingers Stroke: 0.25"
Typical Command Processing Time: 1-5 seconds
Computer Interface: RS-232-C
Power: 120/240 V AC (switchable) 50/60 Hz (@ 3.3A) Ambient Temperature: 60 to 95°F (15.6 to 35°C)
Ambient Humidity: 30 to 85% RH (Non-condensing) Overall Chassis Dimensions (XL): 44.5"W x 30"H x 21"D Overall Chassis Dimensions (STD): 26.5W x 30"H x 21 "D Syringe Drive Height Above Cabinet: 11"
Arm Height Above Cabinet: 1 0"
Net Weight: (XL) Approximately 150 Ibs. (68.04 kg)
Net Weight (STD) Approximately 75 Ibs. (34.02 kg)

Workstation Components

Refer to Section 2 (Workstation Protocol) for a list of Workstation Components.

Documentation

A WS Manual
Installation Video (When not installed by Bohdan Personnel) Application Software (3.5" Disk)

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Computer Specifications

The following computer hardware requirements are necessary for optimal Workstation performance:

CPU: HP Vectra XA P 11266 MHZ
Communications: RS-232-C
PORTS: * Extended 8 Serial Ports
COMI : Reserved for Workstation Controller COM2 - 4: For auxiliary serial devices, as required LPT I: For printer, as required
Bus (Non-Serial) Mouse
RAM: 32 MB
Hard drive: 4.3 GB (40 MB Free Disk Space Minimum)
Floppy drive: 3.5" 1.44 MB
CD: 24X 10/100BT
Monitor: SVGA 1024 x 768 (16 Color Minimum)
Video Adapter: SVGA

Printer Specifications

Printed output from the Workstation requires any WindowsTM supported printer.

Software Specifications

Bohdan Automation Software Applications are written for a Microsoft WindowsTM environment. The following computer

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software requirements are necessary for optimal Workstation performance:

DOS 6.2 or Higher
Windows 3.1
ExcelTM for Windows (If Calculations Are Required) Windows NT 4.0 (Required for this application)

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SECTION 4 : INSTALLATION

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Unpacking

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Carefully unpack and check to make sure all parts are included with the unit. The plate washer and computer for this unit are packed in separate boxes. Notify Bohdan within 48 hours if any damages are found.

NOTE: Remove the cable ties that prevent the X & Y belts from moving the transport arm.

They can be located at the left and right side of the transport slides and across the front of the X axis slide. These can be clipped with a small wire cutter. Take extreme care to avoid damaging the drive motor belts.

All accessories and supplies for the workstation are contained in a separate

carton.

Cables and Tubing Connections

Refer to labeling on the Automated Workstation and its peripherals for proper assembly of connections.

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Precautions

While installing and connecting the components of the workstation, the following precautions should be followed when applicable.

1. Before plugging the unit into an AC power outlet and turning the unit on, please thoroughly read Section 2 and 5.
2. When considering the location for the Workstation, allow at least 3 inches behind the Workstation for adequate cooling and ventilation and 10" above the Workstation for arm movement.
3. Check the position of the Voltage Selector Switch on the side of the Workstation. This should be set to 120 V AC for operation in the USA.
4. If the Voltage Selector Switch is changed, the fuse must also be changed per the following specifications: 120 V AC - 5 Amp, 240 V AC - 2.5 Amp.
5. Before following any of the Teach procedures, remove all glassware from the racks and the inside area of the Workstation.
6. The Powder Dispenser Module Motor is not waterproof, do not immerse in liquids when cleaning,
7. Syringe fittings are to be fmger tightened only. If a wrench is used tighten no more than one eighth turn past finger tight. Overtightening the fittings will create leaks.
8. The syringe 3-way valves are plastic and the liquid seal can be damaged by twisting or pulling on the syringes or fittings.
9. Use inlet filters for the solvent lines supplying the syringes to prevent particles from scratching the syringes or fouling the cannula.

A WS Leveling Procedure

Before operating or establishing the primary coordinates the Workstation must first be leveled. For a XL Workstation, locate the two round liquid-bubble levels on the top sides of the Workstation, or for a 8m Workstation, locate the liquid bubble level on the top back of the Workstation. Turn the four leveling legs at the comers of the A W8 so the bubbles are centered in the black ring. For a XL Workstation, turn the two center leveling legs until they just make contact with the bench surface and then turn them one eighth turn more so that they just support the center of the *unitt* Recheck the bubble levels and adjust the legs as necessary. The unit will now be on a level plane. This procedure should be done and re-checked whenever the instrument is moved.

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Turning on the A WS

NOTE: THE A WS MUST BE TURNED ON BEFORE TURNING ON THE CO~UTER. THE SAMPLE NEST MUST BE REMOVED FRO BALANCE BEFORE TURNING ON THE A WS.

The A WS has an IEC (International Electrical Connector), on the right side of the instrument. Enclosed in this connector is a fuse clip, voltage selector and the
main Power On switch. "1" is on and "0" is off. Turn the switch on. The cooling
fan at the back of the unit will turn on. Looking at the front of the instrument is a System Start Button, Power On light, and a Emergency *Off* switch. This E-Stop switch must be in the *"out"* position before anything will turn on.

When the IEC switch is turned on, the System Start light will come on. When the System Start button is pressed, and the light goes off, this indicates minimum system air pressure has been reached.

If the instrument is ready for use, the system start light will go off when the button is pressed. If the light does not go off, minimum air pressure has not been reached. Once the System Start light is off, the power light will turn on, indicating the A WS is ready to run.

Software Installation

The Application Software required for operation of the Workstation is contained on a 3.5" diskette shipped with the Workstation. The software is already on the hard drive, but, if necessary, fe-loading can be accomplished using
Windows N File Manager and following nonnal file copying procedures. Create a
separate directory and copy the software to it. From WindowsTM Program Manager create a new Program Group and, for each executable file (*. *exe),* a separate Program Item. The application can then be executed from the appropriate icons. (Refer to Sectio~ 5-Software Operation).

Read the Software License and Warranty Agreement included with this product to understand the legal restrictions governing copying and installation.

4-3 .*AWSManuaZ.* 8/95

Setup Modes for the Mettler Balance

The Mettler Balance is configured from the balance following the instructions supplied in the balance manual. For proper operation, the following defaults are recommended.

WEIGHING MODE

MENU

a) Set Reference Weight for Piece b) Internal Calibration
c) Set Weighing Process Adapter d) Set Vibration Adapter
e) Fully Automatic Door Function

CONFIGURA nON REGISTER

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a) Scale! ASD b) Readability
c) Readability - Semi-Micro Range
d) Auto Zero
e) Calibration and Linearization
f) Unit 1
Unit 2
g) Status Indicators
h) Beeper
i) Data Transmission Mode
j) Data Transmission Rate
k) Parity
1) Transmission Protocol
,rn) End-of-Line Mode

Computer Setup

100%
Int
'**Medium** -Medium
Auto

3 dO.l~ dFO.Olmg Off Auto off g
g Auto On/Off (operators option) Stb
2400bd. E Soft
crLF

The personal computer for the workstation is packed in a separate container. Set up the computer and monitor as per the manufacturers instructions. Plug in the RS-232-C serial communications cables as indicated in Section 4.2 (Cables and Tubing Connecti0ns).

We recommend a surge protected power strip.

4-4. *AWSManuaZ.* 8/95

Powder Dispenser Module Installation

Insta11 the dispenser support rod into the first hole from the front (at the right side of the A WS), and tighten the thumbnut in place. Plug in the cable to the dispenser, and plug the other end of the cable into the 21 pin connector, which faces the balance at the right side of the A WS. The other connector on this cable assembly goes to the mixer device.

NOTE: Use caution when adjusting the module height. The module reservoir must be above the top level of the container in the dispenser slide nest (when present on the A WS). If this position is set too low, The container may break the reservoir when the container is moved under the dispenser. The dispenser must, however, be set low enough to prevent dispensing powder outside of the container.

4.10 Powder Dispenser Reservoir Installation

The glassware has a teflon auger screw that has a hex shape machined on the end. This hex fits into a similar hex on the motor drive. Fit the auger hex into the motor drive by rotating the screw as necessary. Stretch the spring bar around the glassware to secure it in place. The auger screw can be removed for cleaning by unscrewing counterclockwise, while gently pulling out of the glassware. The O-ring seal can also be removed for cleaning. When re-installing the screw, turn clockwise while pushing

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gently into the glassware.

NOTE: Warning: Always empty the auger screw of powder before removing the auger. Failure to do this may cause powder to be pushed backwards into the glassware resulting in breakage of the glassware.

Powder Dispenser_Mixer **Installation**

The mixer is lowered down, rotated and locked into place on two slots and pins. When properly aligned, the mixer can only be positioned one way. Plug the mixer into the top connector on the motor drive unit. The mixer probe can be removed for cleaning by unscrewing the probe from the mixer motor unit.

WARNING! The motor unit is not waterproof, do not immerse when cleaning!

4.12 Setup Modes for the Orion Model 720A pH/ISE Meter

The Orion Model 720A pH/ISE Meter is configured from the meter keypad following the instructions supplied in the Instruction Manual. For proper operation, the following defaults are recommended.

Start with the meter off, then turn on holding in zero while plugging in meter. When the meter prompts whether you want to reset meter, enter yes.

SET -UP MODE

MENU

a) Hold
b) Data Print mode
Set Print Mode
l-RDY 2- TIM 3-MAN Set LOG Mode
c) Options
Change Iso Pt. Transfer Data
Data Clear Autoshutoff

On

Yes l-RDY; Yes to enter No

No No
User Option Off

4.13 Setup Modes for the Orion Model 170 Conductivity Meter

The Orion Model 170 Conductivity Meter is configured following the instructions supplied in the Instruction Manual

file:///C|/DOCUME~1/markun/LOCALS~1/Temp/~LWF0000.htm (64 of 106)9/29/2004 12:01:21 PM
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SECTION 5 : SOFTWARE OPERATION

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5.11 Emergency Stop/Pause

Application Components Description

Section 5 contains a set of windows generic to all Workstations which demonstrate the general layout of the software. Please refer to your Workstation Protocol (Section 2) for component input parameters and overall operation of your Workstation. The software is installed to your system before delivery, but ifre- loading is necessary, please refer to Section 4.6 (Software Installation). The icons for software are specific to your Workstation and its unique components.

Sections 5.2 - 5.6 describe the operation of teaching positions. TEACH is defined as the best possible position for the component (i.e. hand, aml, cannula, etc.) at the time of a specific task. For example, if the gripper needs to pick up a sample container, you should TEACH where it is uniform around the container, at an appropriate height.

Note: The container should be taught at the same height for each component.

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This section is only to serve as a guideline. Sections 5.2 and 5.7- 5.11 contain information specific to the setup operation of the Workstation. The Workstation Protocol in conjunction with these sections are used to define parameters and explain how to run the workstation.

Icons

Using WindowsTM Program Manager, the Bohdan Automated Workstation Application Program(s) may be accessed. The first window shown in Figure 1 contains icons representing a TEACH sequence (Sec 5.2 - 5.6), or a particular Process generalized in Section 5.8.

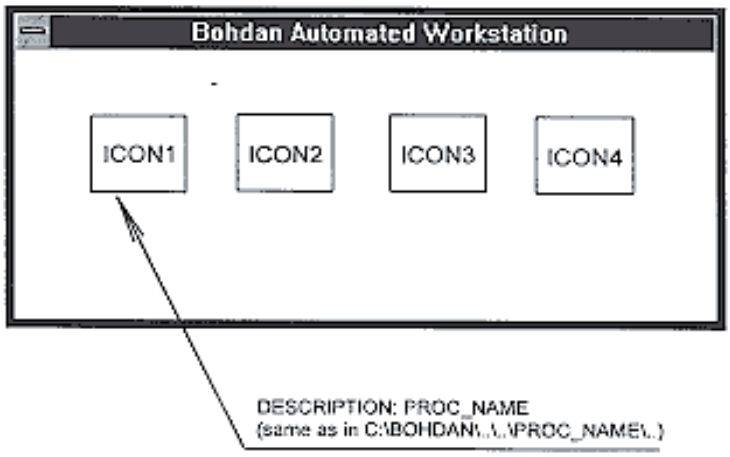


Figure 1

5.3

Teaching

TEACH is accessed from the Bohdan Automated Workstation Main Menu (Figure 1). TEACH is used to define robot positions. Upon starting TEACH, a warning prompt will appear (Figure 2).



Figure 2

The Workstation should be checked to see if anything is in the gripper. If so, remove the object and click **OK** with the mouse.

Note: Other Caution messages may appear when applicable to the Workstation (Figure 3).

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Figure 3

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Clicking **OK** will cause the Bohdan Initialization Banner to appear, followed by the Teach Process Window of the Bohdan Automated Workstation (Figure 4).

I ream

Jjelp

E~t

Figure 4

When TEACH is selected, the Teach Positions Main Menu of your system along with a pictorial of the major components will be displayed. Figure 5 represents a general model and will vary between Workstations.

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~.'

-

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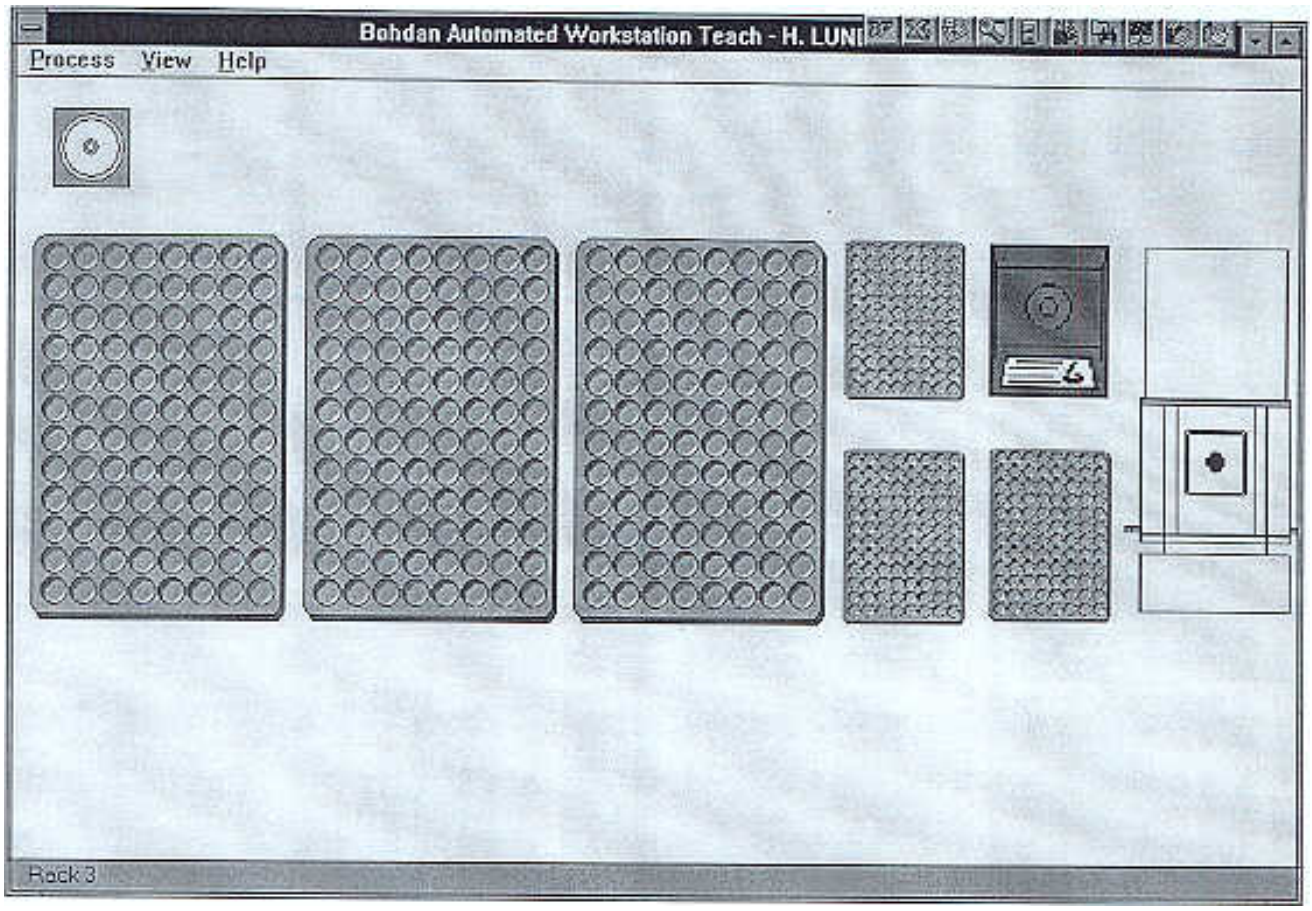
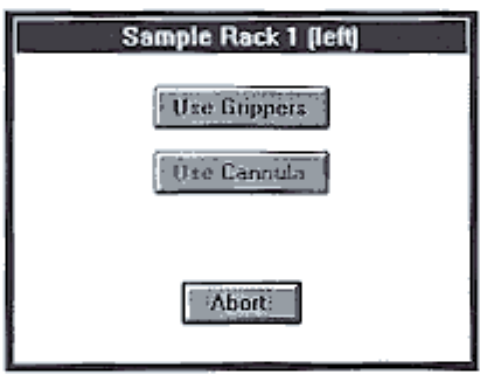


Figure 5

When the workstation is installed or moved to a different location, TEACH should be used to fme tune your system. The Status Bar (depicted in Figure 5 as Sample Rack 2) identifies names of positions available for teaching. Pressing the left mouse button with the cursor over a selected component will advance to the individual Teach Menus. Cancel will return to previous menu.

Figure 6 is a Rack Position Teach Menu. This particular rack requires Teaching at the gripper and cannula positions. If the gripper position is selected, then the gripper should be taught where it picks up the vial. The Cannula teach position is where the cannula can access aspiration or dispensing.

,



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5.4

Figure 6

Teaching Single Positions

Most major components require a single position to be specified. This position will be specified by the operator at where the gripper transfers items to or from, or where the arm moves to while an operation is in process. If multiple options are offered for a specific component, as in Figure 6, then all applicable positions need to be taught

Selecting a component from the Teach Positions Main Menu (Figure 5), and specifying a position, if applicable (Figure 6), will display the Teach Ann Position window (Figure 7).

Figure 7 includes a description of the position being taught along with auxiliary functions and buttons that may be helpful in refining the position. Raise the arm by clicking the up arrow or by pressing the <Home> key to move in single step increments. Lower the arm by clicking the down arrow or to move in single step increments by pressing the <End> key until the gripper is positioned.

IThe arm can be manipulated in the x, y, and z directions to achieve the correct position. Click the on screen ARROW KEYS or, to move in single step increments, press the keyboard ARROW KEYS and the <HOME> and <END> keys to position the hand correctly. The hand can be closed by clicking <Close Grippers> and opened by clicking <Open Grippers> (Figure 7). Open and close the gripper hand to verify if the position is taught. Neither the teach tool nor the arm should move.

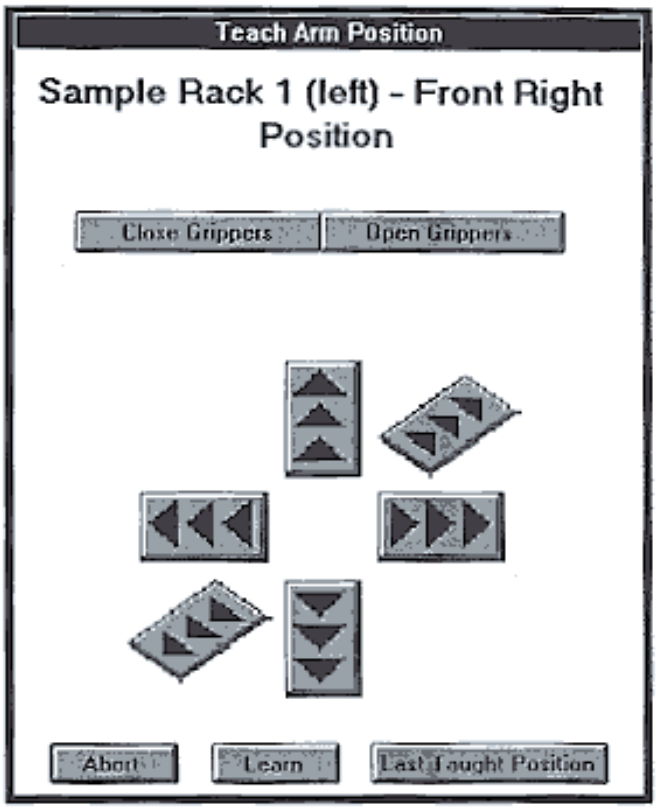


Figure 7

With the mouse, double-click on the TEACH icon (Figure 1). Follow the warnings and prompts as explained in section 2.

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When your workstation template appears, click the component you wish to Teach (Figure 5).

-

You will have the following options (Figure 7):

Last Taught Position:

The arm will move to the last taught position for the component specified from the workstation template. The operator may fine tune the position with the mouse or keyboard. If adjustments are made, click "learn" to teach the position. If no adjustments are made, click" Abort" and the ann will return home without storing the new position.'

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Note: If the Workstation has interchangeable parts, care should be taken to verify that the correct parts are in place before using "Last Taught Position." If you are unsure of the "Last Taught Position" operation, you may move the arm with the keyboard or mouse from the home position to the position being taught. Learn will teach the position.

5.5

Learn:



Figur:e 8

Selecting yes at the learn confirmation box moves the arm home and stores (learns) the newly defined position.

Abort:

Exit the Teach Arm Position window without changing the stored teach position

Teaching Racks

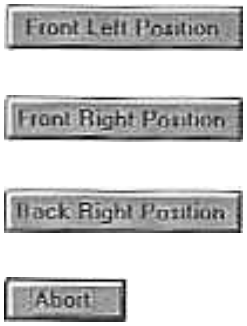
Entire racks may be specified in three positions. These separate positions are specified where the gripper picks up, drops off, or moves to. Figure 9 shows the menu which allows you to choose the position to be taught (front left, front right, or back right). All three must be specified before a rack is taught.

Note: Multiple TEACH positions may be required per rack, each containing three corners (Figure 6).

When the rack is selected on the system template (Figure 5), the comer selection menu will appear (Figure 9). After all three positions are taught, each comer can be refined separately.

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5.6

Figure 9

Each comer of the rack is taught similar to the single point teach method. After selecting a rack comer to be taught, refer to Section 5.4 for single point teach. Referring to Figure 6, both the cannula and gripper positions must be taught at all three comers.

Fine Tuning Positions

Mouse: When tuning positions, the mouse can be used to move the aml forward, backward, left, right, up, or down by the arrows (Figure 7) which depict the movement of the aml as you look at the front of the Workstation. The left button of the mouse may be held on an arrow position to move the aml faster.

Keyboard: The arrow keys along with the home and end keys are used for single step increments.

Note: Use caution when teaching positions. Be careful not to run the arm into Workstation Components. Single clicks using the keyboard and mouse should be used until the operator is familiar with the speed and movement of the arm.

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5.7

5.8

File Management

(1)

Directory

C:\BOHDAN

(2)

Sub Directory

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C:\BOHDAN\ TEACH C:\BOHDAN\PROC_NAME

(3)

Executable Files

C:\BOHDAN\ TEACH\ TEACH.EXE
C: \BO HD AN\PROC _N AME\PR OC _NAME. EXE C: \BO HD AN\PR OC _N AME\PROC _NAME.EXE
etc.

The following filenames and description may be may be helpful.

Table 1

-.-

MMDDmImm . BA W	
MMDDmImm.RPT	
MMDDmImm . DA T	
xxxx.MET	
BOHDAN.PAR	
BOHDAN . TMP	
Process cO~rfi1e (Not fbr~)	
Report file	
Collects new data (If needed)	
Methods	
Unit parameters	
Confirm	
xxxx . TBL	Input data tables (If applicable)

Window Menus

A New Process may be executed from the Process Menu (Figure 10). The process will not run if proper parameters have not been established. These param~ters may include Method, Unit, and Run (not shown in Figure 10) Parameters. Different Steps, Methods, Unit or Run Parameters may be specified for variations in procedures as applicable to the workstation.

Continue may be used to start an incomplete process that has been interrupted (Figure 10). The computer will prompt you for the run name. If the run entered has been completed or cannot be found, the appropriate message will appear on the screen (See Section 5.10, Continue Session).

J'
Exit brings you to the previous window.

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.unit Parameter

,C.ontinue ~it

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Step 2 Step 3 Step 4

(Beports)

[frime)

ftc

Uel~

Figure 10

The Method Menu can specify parameters which may be stored to a file for future use. Method Files are created for different applications (Figure 11).

I) Choose Method
2) Specify Parameters
3) Save Parameters (remember the Method File Name entered)
4) The Method File Name may be required as a Process Parameter.

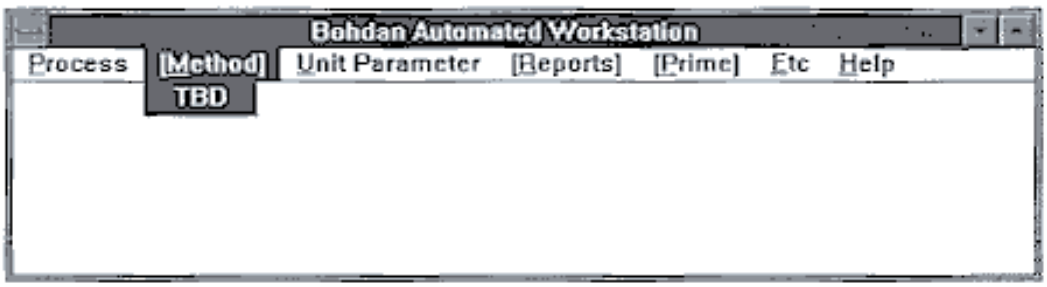


Figure 11

The Unit Parameters are parameters common for the system (Figure 12). A password may be required for access to the Unit Parameters if a change is needed.

,

5-10. ,AWS Manual.8/95

I erocess

[erime)

ftc

Help

Figure 12

Report Menu can access data from completed runs (Figure 13). The file may be specified by "proc_nme.rpt" as entered in

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input parameters or by the Date and Time. i.e. MMDDHHmm.rpt.

I Erocess

[Method]

Etc

Report 2

Help

Figure 13

Prime is used to prepare a workstation component for operation (Figure 14).

1) Specify Parameters 2) Initialize sequence
3) Visually check ~tus of component '4) Repeat if necessary

I frocess

[Method]

,

!!nit Parameter

tlelp

Syringe 2 Pump 1 Pump 2 Powder 1

Figure 14

5-11. *AWSManua/.* 8/95

Prime is also used for installation of syringes (section 6.9). For example, when installing the syringe, the Prime Sequence, Syringe I, allows the user to extend the syringe plunger.

Etc...is used to specify a particular task for the Workstation. i.e. Home Robot, Open Cover, Close Cover (Figure 15).

I Erocess

[Method]

.unit Parameter

(Beports)

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Open Cover
Close Cover

Figure 15

Help provides Bohdan Automation address and phone number (Figure 16).

I Erocess

[Me~_~d]

.u.nit Parameter

(Beports)

_~me)

About

Figure 16

Run Time Messages

Before a new run, several start-up messages may appear and act as a checklist of manual operations for the operator (Figure 17).



Figure 17

A notice signaling completion of the process is displayed at the end of a run (Figure 18).



"Process Name"



Figure 18

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Press "OK" to restore window and end pop-up report if exists. Report Menu will be an active window and could also be a word processor or spreadsheet.

Con~nue Session

From the Bohdan Automated Workstation window (Figure 10), select Continue and the Continue Interrupted Session File Open Window (Figure 19) will appear. This function of the A WS is a fail safe program that continually writes the sample run information to a file so it will not be lost due to unexpected power failure or E-Stop (Section 5.11) power off conditions.

NOTE: For power failure conditions remove any unfinished samples before starting Continue Session. In the event of a system power off condition, the operator must decide whether the conditions of the A WS and samples warrant a continuation of the session.

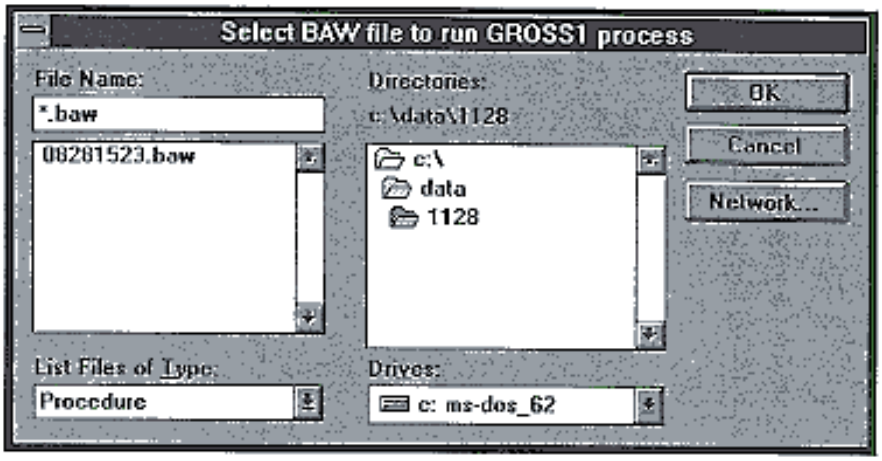


Figure 19

Select the desired file, press <OK>, and the COnflDIl Window (Figure 20) will appear.

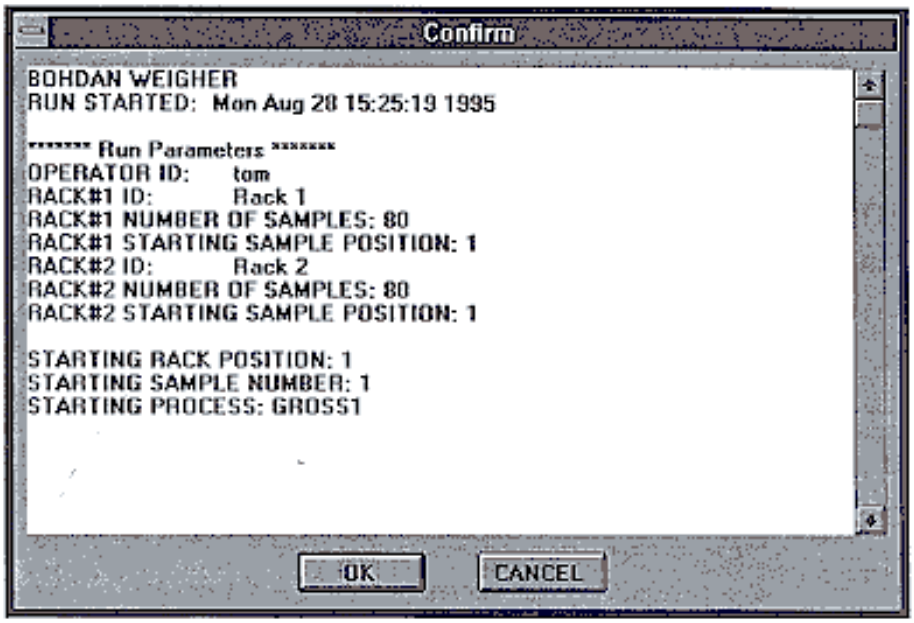


Figure 20

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If the infopnation in the selected file is correct, click <OK> to start the sample run. The A WS will continue the program (after displaying the run start message boxes) where it left off and finish the sample run.

NOTE: If the A WS has been stopped while a sample was being processed, the Workstation will continue processing with the next sample when the unit was stopped if the process changes the sample (i.e. Dilution Workstation). If the sample is not changed (i.e. Weighing Workstation), the Workstation will continue from the last sample that was completely processed.

5.11 Emergency Stop/Pause

Should the need arise to stop the system immediately, a red emergency stop button (E-Stop) has been provided on the front of the A WS. Refer to Section 10.1 (Troubleshooting) and Section 5.10 (Continue Session) for restarting the A WS. For pausing the run, a red pause button has been provided at the bottom right of the A WS Run-Time Information Window (Figure 21). Click the button with the right (as opposed to left) mouse button to halt the process and end the A WS session.

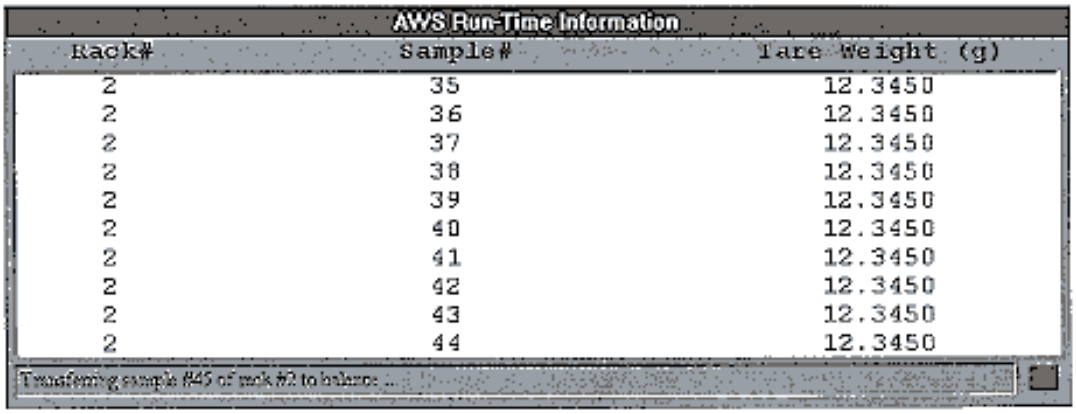


Figure 21

The system will stop once the currently running process is completed and wait for a response from the Confirmation Program Exit window. Click <YES> to exit the Application Program to Windows Program Manager. The system should be rebooted to run the Workstation and eliminate any possibility that the interruption may effect the application program. Click <NO> and the system will continue on from where it was paused.

SECTION 6 : SERVICE/MAINTENANCE

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Section

6.1 **Product Support**

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6.10 Lexan Shields or Enclosures

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-

6.11 Accessories

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6-5

6.1

Product Support

Bohdan Automation offers a variety of support options to help you get the most out of your Automated Workstation. If you have a question about a Bohdan Automation product, first look in the printed documentation. If you cannot fmd the answer, contact Bohdan Automation Product Support.

Call (708) 680-3939 Monday through Friday, between 8:00 A.M. and 4:00 P.M. Central Time. Please be prepared to provide the following information:

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a) Your product's serial number.
b) The version number of the software you are running.
c) Any special hardware you are using or any special modification that has been made at the factory or at your facility.
d) The exact wording of any error message.
e) What happened when the problem occurred.
f) How you tried to solve the problem.

Lubrication

The A WS is designed to give long life performance with little maintenance. The overhead transport rides on non-lubricated Delrin@ plastic rails in the X and Y directions. Wipe the plastic rails off with a clean dry towel every 90 days. The steel ball bearings that roll on them are permanently sealed and require no lubrication.
The Z axis (up & down) rides on a stainless steel linear rail. The rail has a ball bearing block that requires lubrication. Every 90 days, wipe the rail clean and apply a small film of #2 lithium soap base grease to the rail. The bearing block does not need any additional lubrication.

The pneumatic horizontal slides on the A WS need to have the raceways wiped!of! with a clean ~ towel every 90 days. Apply a small film of #2 lithium soap base grease to the rails. Some of the bearing blocks have automotive type zert fittings which most standard grease guns will fit.

Belt Adjustments

The axes are driven by Kevlar@/polyurethane timing belts. These belts will give long life performance but do require adjustment after a "breaking in period".
The X, Y, and Z ~s belts require proper tensioning. Use the following procedure to tension the belts.

6-1. *A WS Manual.* 8/95

1. Turn off the A WS.
2. Push the Y axis (axis that moves from front to back) all the way back to its home position.
3. Push the X axis (axis that moves from left to right) all the way to the left side of the instrument to its home position.
4. For both X and Y axes, use a 100 gram standard weight. Place the weight on the belt near the center, and measure how far the belt moves (as the weight is placed on the belt).

NOTE: The belt should move not more than 1/8" (3.17 mm), and not less than 1/16" (1.58 mm).

X axis adjustment: There are two belts used in the X axis adjustment: The small belt to the right side of the carriage should be adjusted first. To adjust this belt, loosen the Phillips head screw that secures the double pulley. Also loosen the Phillips head screw that secures the idler pulley, from the long belt at the left side of the arm. Push or pull the double pulley to get the small belt snug. It is not possible to use the 100 gram weight here. Re-tighten the screw on the double pulley. Then, use the weight on the long belt to get the measurement correct. Re-tighten the screw on the single idler belt pulley.

NOTE: For XL A WS Models, the X axis belt should move not more than 3/16" (4.75 mm), and not less than 1/8" (3.17 mm).

Y axis adjustment: To adjust the belts, loosen the two nuts that hold the idler pulley, near the front edge of the instrument. Push or pull the pulley to get the belt measurement correct. Repeat this for both left and right belts.
5. It is necessary to "square" the Y axis after adjusting the belts. Pull the overhead carriage towards the front of the instrument, until it rests against the rubber stops,- If the carriage does not rest against both stops evenly, do *i* the following procedure:
a) Locate the solid drive shaft coupling to the right side of the motor coupling.

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b) Loosen one screw of the solid drive shaft coupling and pull the carriage forward again, to the hard stops. Loosening this coupling will allow the shafts to rotate freely.

c) Now re-tighten the coupling and the axes will be square.

6. The Z axis adjustment is done by loosening the clamp block located at the top of the arm. Loosen the Phillips head screws and move the arm up and down, while pushing the belt clamp up, to remove any slack in the belt.

NOTE: Re-teach all positions.

Pressure Gauge/Regulator

6.5

The system has an external regulator/filter/gauge combination unit. At the bottom of the filter is a valve pin. The pin is a drain valve for the water trap. Push the pin in to release air from the system and drain any water from internal condensation of the system.

Hold a container under the drain to collect any expelled water. Drain the filter when water is obvious from looking through the clear plastic drain bowl. Depending on humidity conditions, this filter should be checked weekly for water.

At the top of the valve is a pressure control knob. The pressure should be set to 60 psi at the gauge. Set the pressure by lifting the knob and rotating it clockwise
to increase, or counter-clockwise to decrease the setting. Push the knob down to lock it into position. Within the plastic bowl is a ferret filter to collect dirt particles that may enter the air system. Every 90 days clean the filter by removing it and soaking
it clean in a soapy water mixture, then blow it dry. No oilier internal maintenance is necessary for the air system.

Filter Cooling Fan

A cooling fan containing a sponge filter, is located at the back of the instrument. The filter can be accessed by unsnapping the outer cover on the filter assembly. Filters may be rinsed clean with distilled water, air-dried, and returned to the unit for continued use.

Powder Dispenser

The Powder Dispenser Reservoir should be cleaned after each use and before starting the system when the Workstation has been left unused for long periods of time. Deionized water or any solvent (compatible with the glass, Kel-F, and PVC components of the reservoir, mixer, and module) that is best used to solvate the sample are recommended for cleaning. After cleaning, rinse well in distilled or deionized water and dry thoroughly. Compressed air or a vacuum source may be used for drying the reservoir. Refer to Section 4 for proper handling of the module, mixer and reserv6ir.

Peristaltic Pump

The tubing used in the peristaltic pump must be changed or moved within the pump head as the tubing stretches and wears. Please refer to the pump manual for instructions. The tubing for the pump has been selected for compatibility with the solvents in use. When changing the tubing, replace it with tubing of the same size and material.

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NOTE: Changing this tubing size will effect the efficiency of the A WS and possibly leave the cannula wet.

Cannula

When left for long periods of time, the cannula may need to be cleaned. This can be accomplished by purging the lines with the solvents as described in Section 6 (Syringes). If the cannula becomes plugged, use a fine wire to carefully clear the blockage. Be careful when cleaning the cannula to avoid bending or twisting the cannula or X- Y -Z arm. If a chlorinated solvent is required for cleaning the tubing and Cannula, disconnect the tubing from the syringe valve and introduce the solvent through the tubing without the use of the Syringe Pump. If the syringe encounters excessive pressure with the chlorinated solvent in the barrel, the solvent may gain access to and dissolve the adhesive used to hold the syringe barrel to the luer lock fitting.

Syringes

Run the Prime Sequence (Section 5) to lower the syringe plunger. This will make removal possible. I_I the glass syringe by turning it clockwise into the valve /itting while putting the plunger end on the drive pin. Do not tighten the thumb screw into the drive pin completely. This screw should be coated with service removable "Loctite" and tightened fully, then backed off 1/4 turn. This is done to avoid additional tension that might be exerted by the syringe barrel and drive mechanism being out of parallel.

NOTE: Use extreme caution to prevent bending the tip of the syringe valve while attaching it to the valve. This will cause damage to the valve seal and

. J'
syrInge.

Deionized water, acetone or any organic solvent that is best used to solvate the sample are recommended for cleaning. Avoid carbon tetrachloride, methylene chloride, chloroform, detergents, phosphates, and alkalines when possible. Syringes may be soaked overnight in a mild solvent or immersed in a sonic cleaner for a few hours. After cleaning, rinse well in distilled or deionized water and dry thoroughly. Compressed air or a vacuum source can be used for drying the barrel. Minimize the use of a "dry syringe." The Teflon@ plunger tip requires liquid to act as a lubricant between the glass and the plunger tip. Lack of lubrication during syringe use causes "tip shredding" which significantly reduces the life of the plunger tip. A light coating ofpolydimethylsiloxane (100 centistokes at room temperature) lubricant can prolong the life of the syringe barrel, but can only be used with a dry syringe. It is recommended to use inlet filters for the solvent lines supplying the syringes to prevent particles from scratching or fouling the syringes. Refer to syringe manufacturer's care and maintenance for additional information.

6.10 Lexan Shields or Enclosures

The use of mild soap and water to clean Lexan Shields or Enclosures is recommended. Use of any other window cleaners or solvents may cloud or dissolve the Lexan.

6.11 Accessories

Service and maintenance of any accessory on the A WS should be performed routinely. For proper operation, service and maintenance of each accessory, consult the manual included with the accessory.

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SECTION 7 : WARRANTY

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Section

7.1 Warranty

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7.2 **Cancellation/Return** of Items **7-1**

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Warranty

Bohdan Automation warrants that the equipment supplied is free from defects in material and workmanship for a period of one (1) year from the date of delivery. This warranty is based on the assumption that the equipment shall be used for the intended purpose only and will be maintained properly. The above warranty shall not be valid in the event of damage caused by accidents or negligence, as determined by Bohdan Automation, Inc. This warranty includes parts and labor only. If equipment is outside the immediate Chicago area, Buyer is responsible for all travel and lodging expenses. Under this warranty agreement, the responsibility of Bohdan shall be limited to the repair or replacement F.D.B. Mundelein, Illinois, under Bohdan's option, any malfunctioning parts or components produced by Bohdan. The warranty shall not be enforced where machine or component on the original installation have been modified or changed in any manner by anyone except a Bohdan engineer. Where allowed by the original parts manufacturer, Bohdan will transfer all applicable warranties and their provisions to the end user.

Except as specifically provided in this Section 7.1, there are no other express or implied warranties. All express and implied warranties for the equipment, including the implied warranties of merchantability and fitness for a particular purpose, are limited in duration to the warranty period. No warranties, express or implied, will apply after this period.

Cancellation/Return of Items

Authorization number must be obtained from our Customer Service Department before returning items for any reason. Please include data regarding the reason items are being returned. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Bohdan Autom,ation will not be responsible for damage resulting from careless or insufficient packing. A 25% restocking charge will be made on all authorized returns.

NOTE: Bohdan Automation reserves the right to make improvements in design, construction and appearance of our products without notice.

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SECTION 8 : PRECAUTIONS/STORAGE

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8.1 Electrical Precautions

8-1

8.2 Mechanical Precautions

8.3 Chemical Precautions ...

8.4 Storage

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8-1

This equipment is intended to be used only in compliance with all state and federal safety laws such as OSHA, EP A, etc., as known at the date of shipping.

8.4

Storage

The Workstation should be stored on a flat surface that is relatively free of vibration. The storage environment should be free of dust and other foreign particles.

The Workstation can be stored under the following environmental conditions:

Temperature: 15.6 to 35°C (60 to 95°F) Humidity: 30-85% RH (Non-condensing) Altitude: 4,572 m (15,000 it)

The Workstation should be protected from temperature extremes that can cause condensation within the unit and from corrosive fumes and vapors.

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Electrical Precautions

Before connecting the Workstation to a power source, check the voltage selection switch setting to ensure that the proper

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voltage has been selected (see
SECTION 4: INSTALLATION for switch location).

The power cord supplied with the Workstation should be inspected periodically for craCks. Disconnect the power cord when opening the Workstation cabinet for any reason; for example, when removing the back panel to check belts (refer to SECnON 6: SERVICF/MAINTENANCE). All adjustments and repairs of the Workstation should be performed by Bohdan service personnel.

Consult owners manuals with regard to operation of subsystems such as hot plates, balances, computers, etc.

Also, it is important to follow all local, state, and federal electrical codes. This equipment is only intended to be used under current electrical codes.

Mechanical Precautions

The X- Y -Z transport aml may move without notice. Never attempt to place your hands inside the working envelope while the Workstation is operating.
The mechanical operation of the unit is brisk and forceful and should in no way be interfered with during operation. When operating the unit, access the work compartment only when instructed by the program. Keep all objects out of the unit when the machine is in motion.

Chemical Precautions

The reagents and samples used on a Workstation must be treated with the
same special handling precautions that any hazardous materials or chemicals require. Caution should be used when handling these materials on or off the Workstation.

Normal laboratory safety precautions should always be followed to support the routine handling of these chemicals/samples. The operator should comply with all precautions associated with the chemicals/samples present on the Workstation similarly to those outlined by the customer's company policies. Material Safety Data Sheets available through the chemical manufacturer should be stored in a secure, but accessible, place near the Workstation.

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SECTION 9 : SHIPPING

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9 . 1 S h i p p i n g

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9.1

Shipping

When the Workstation is shipped to Bohdan for service or repair, the unit must be shipped in the original packing; other forms of commercially available packing are not recommended and can void the warranty. If the original packing has been damaged or lost, contact Bohdan for replacement packing.

SECTION 4 (INST ALLA TION) discusses the packing materials used with the Workstation. The Workstation must be repacked according to the following procedures:

1. Disconnect the power cord from the Workstation and return with the unit. 2. Remove the racks and wrap in bubble wrap.
3. Remove the balance and pack in its original box.
4. Secure the Workstation and Multifunctional Head so that no motion occurs in the X or Y axes. Use locking wire ties around the belts to mesh the teeth. thus preventing movement.
5. Place the X- Y -Z transport arm in its lowest Z-axis position.
6. Place the unit on foam in the crate bottom and reposition the braces.

The remainder of the accessories for the Workstation do not need to be returned with the unit unless specifically instructed by your Bohdan service representative.

Before the Workstation is returned to Bohdan make sure you have addressed each item in the following checklist:

1. Obtain a **Return Authorization Number** from a Bohdan Representative. 2. Write the Return Authorization Number on the outside of the box in plain
view.
,3. Include a statement of what is required of the Service Department (state
, whether the unit requires calibration, cleaning or repair).
4. Provide the name and telephone number of the person to be contacted with any questions.
5. Insure the Workstation for full value.

The Workstation should be shipped by air ride ground transportation only. Do not ship air freight unless specifically instructed.

SECTION 10 : TROUBLESHOOTING

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10.1 Troubleshooting 10-1

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10.1 Troubleshooting

FAILURE: Power Cannot Be Turned On.
INSPECTION PROCEDURE: Verify the system start lamp lights. CORRECTIVE ACTION: Turn main power switch on at the right side of cabinet. Make sure the Emergency Stop switch button is in the outward position. The system start light will turn on. After the system air pressure is reached, press the system start light and the green power light will come on.

FAILURE: System Light does not turn on when main power switch is turned on. INSPECTION PROCEDURE: Check to see if fan is running at the rear of the cabinet.
CORRECnVE ACTION: Change burned out bulb in system start switch.

FAILURE: System Start, cooling fan does not turn on, when main power switch is turned on.
INSPECTION PROCEDURE: Is there power to the instrument? Is the voltage selector within the main power switch in the correct voltage position? Is the fuse in place or blown? Is the E-Stop out?
CORRECTIVE ACTION: Apply power to instrument, set voltage to correct setting by removing it from the main power switch and installing it correctly. Replace fuse if it is defective. Push E-Stop.

FAILURE: Upon start up of the A WS, the computer states: FATAL ERROR TURN THE SYSTEM OFF REBOOT THE COMPUTER!
INSPECTION PROCEDURE: Is the power turned on to the A WS? Is the system start switch pressed? Is the power light on? Is the RS-232-C communication cable connected?
CORRECllVE ACflON: Turn on the main power to the A WS before turning on the computer. Press the System Start switch so the green power light is on, and the System Start light is off. Connect the RS-232-C cable to Serial! port of the
I
computer, and to the RS-232-C port of the A WS. Refer to computer manual for further serial port testing.

FAILURE: System stops during a run.
INSPECnON PROCEDURE: Check to see the cause of the failure. CORRECnVE ACTION: Correct the problem causing the failure. Remove any glassware that may be in the gripper or in the path of the arm. Move the Z a:xis arm over the rack area so that when the arm homes it will not hit anything. Restart the
J'
A WS as instructed in Section 4.5 (Turning on the A WS).

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SECTION 11 : APPENDICES

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Appendix A: Workstation Diagrams '

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Appendix B: **Hard** Drive Contents

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Appendix C: A **WS Customer Comment** FonD C.

Appendix D: A **WS Customer Consumable** List ,

Appendix A

Workstation Diagrams

Diagrams detailing the functional components of the Workstation have been enclosed in this section.

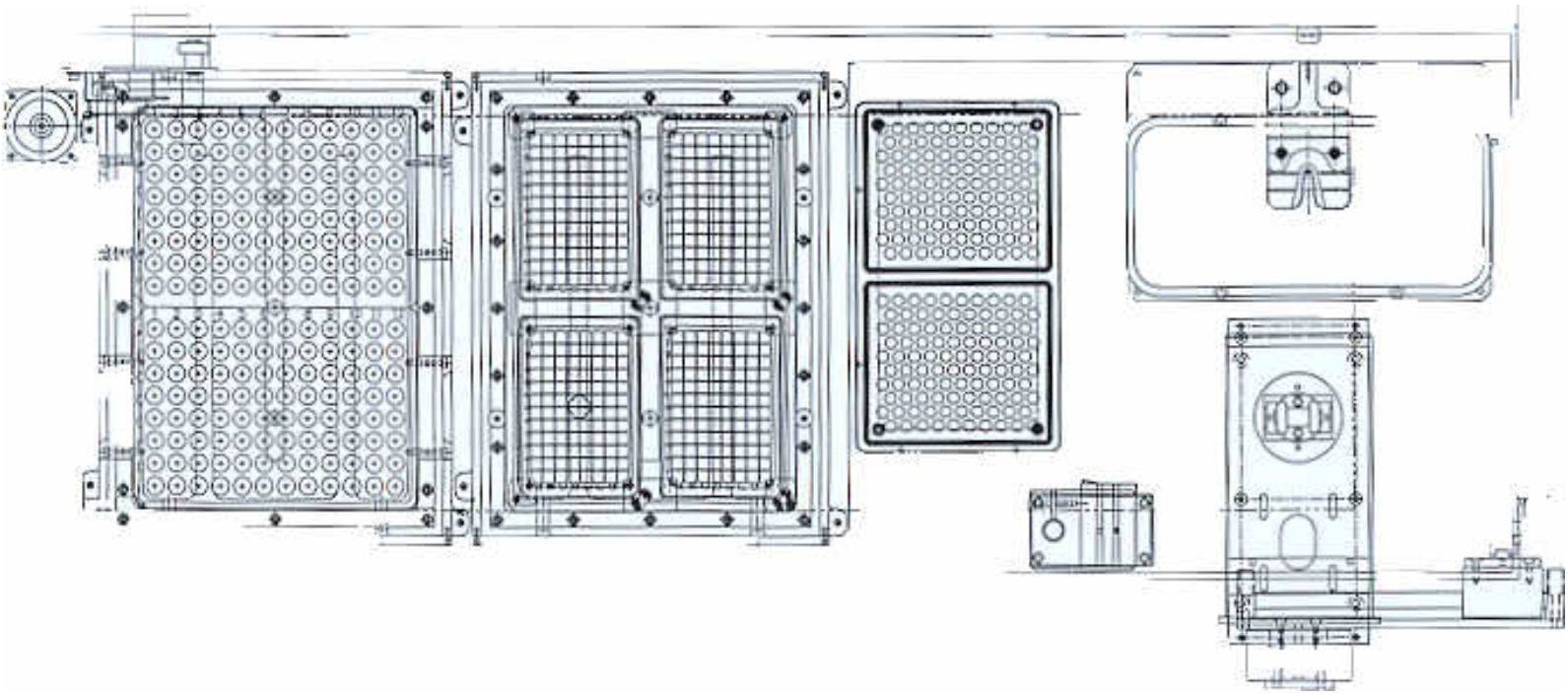
A-I. Manual. 8/97



BOHDAN AUTOMA TION

PROJECT 1323/1324 SEARLE
10/20/97

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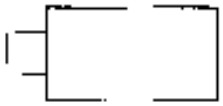
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Appendix

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Hard

Drive

Manual

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C

ontents

Volume in drive C is AMACN32ABA Volume Serial Number is 366C-ICEA

Directory of C:\BOHDAN

10/17/97 12:2Sp 10/17/97 12:2Sp 10/17/97 12:2Sp 10/17/97 OS:33p 10/17/97 OS:34p
5 File(s)

<OIR> <OIR> <OIR> <OIR> <OIR>
Obytes

Directory of C: \BO HD AN\ U11L

UTIL PROC
TEACH

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10/17/97 12:25p 10/17/97 12:25p 10/14/96 08:52a 08/07/95 02:55p 01/17/95 02:55p 01/30/98 04:39p 09/01/94 OI:06p 07/26/95 08:39a 07/28/97 08:45a
12/30/97 06:27p 02/25/98 03:57p 02/17/98 10:45a 02/06/98 05:29p 02/06/98 OS:29p 02/25/98 04:08p
15 File(s)

<DIR>
<DIR> ..
26.608 ADTEST.EXE 79.584 P_U11lA.EXE 3.984 SCRN_CLR.EXE
821 exit_now.txt
46.324 TrY .EXE
49.600 CONTROLSDLL
26.944 PSC- TEST .EXE
72 SYR.ERR
333.312 aws_util.exe 206.848 bawcom.dll
3.474 error. log
91 error.1st
284 aws_util.ini 777,946 bytes

Directory of C:\BOHDAN\PROC

10/17/97 OS:33p 10/17/97 OS:33p 02/12/98 11:18a 02/11/98 03:4Op 02/12/98 10:ISa 02124/98 03:ISp 02/25/98 11:43a 02/05/98 05:13p 01/19/98 02:34p
08/22/96 06:45a 07/26/95 08:39a 02/12/98 04: ISp 02124/98 03:1Sp *02125/98* II :31a *02/2S/98* 03:4Sp 02/25/98 03:SOp
16 File(s)

<OIR> <OIR>

52 operator.sps
157 repli.sps
106 scan.sps
902 baw.sps
153 valid.sps
184,832 PWD.DLL 272,684 MAPPING.EXE 35,623 COLOR.DLL 49,600 CONTROLS.DLL
566 JingJ.inp
167 Defauh.met
339 unit.par
103 prime.par
509,440 Baw.exe 1,054,724 bytes

Directory ofC:\BOHDAN\TEACH

10117191 05:34p 10/17/97 05:34p *12/21191* 12:05p *10/21191* 03:39p 11/19/97 11:25a 11/19/97 11:24a 01/09/97 02:19p 07/08/97 03:06p 12/05/95 10:22a
12/15/97 09:38a 03/21/96 03:11a *11/19191* 11:29a 11/19/97 11:28a 02/24/97 10:59p 02/24/97 II :02p 02124/97 11 :03p *02/24191* 11 :03p 10111/95 04:24a
02125/98 01:58p
19 File(s)

<DIR> .
<D IR> . .
29,056 TEACHCOMDLL 10,296 SEARLEI.TCH 1,150 NEST.BMP
11,446 RCK6X4.BMP 3,538 12X8_SM.BMP 3,6708X12_SM.BMP 2,230 CAPPERBMP 1,150 PEDESTAL.BMP 2,038 SHUCKER.BMP 2,134
SHUTrLE.BMP 1,246 WASH.BMP
55,808 CDRVDLL.DLL 32,768 CDRVHF DLL 42,496 CDRVXF.DLL 8,704 COMMSCR W DLL 49,632 CON1ROLSDLL 70,480 PWD.EXE
327,842 bytes

Total Files Listed:
55 File(s) 2,]60,5]2 bytes
] ,555,005,440 bytes free

Microsoft Diagnostics Report for :BOHDAN

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os Version Report
Microsoft (R) Windows NT (TM) Workstation
Version 4.0 (Build 1381: Service Pack 3) x86 Uniprocessor Free Registered Owner: Bohdan Automation, Bohdan Automation Product Number: IOS97-0EM-0021407-22888

System Report
- System: *AT/ATCOMPAnBLE* Hardware Abstraction Layer: PC Compatible Eisa/Isa HAL
BIOS Date: 09/18/97
BIOS Version: PhoenixBIOS 4.0 Release 6.0.R

Processor list:
0: x86 Family 6 Model 3 Stepping 3 GenuineIntel -266 Mhz

Video Display Report

BIOS Date: 08/22/97
BIOS Version: CL-GD546x Laguna PCI VGA BIOS Version : 61a

Adapter:
Setting: 800 x 600 x 65536
60Hz
Type: c1546xm compatible display adapter
String: Cirrus Logic VisualMedia(TM) Accelerator Memory: 4 MB
Chip Type: Cirrus Logic 5465
DAC Type: Internal
Driver:
Vendor: Cirrus Logic, Inc.
File(s): cI546xm.sys, c15465.dIl
Version: 4.00.1381.152-1.52.08, 4.0.77

Drives Report
-.. -. C:\ (Local- FAT) AMACN32ABA Total: 2,093,792KB, Free: 1,S18,S60KB Serial Number: 366C - 1 CEA
Bytes per cluster: 512
Sectors per cluster: 64
Filename length: 255
0:\ (Local - FAT) VOL_LOG 1 Total: 2,O93,792KB, Free: 2,093,792KB Serial Number: 1055 - ICFO

Bytes per cluster: 512 Sectors per cluster: 64 Filename length: 255

Memory Report
Handles: 1,063 Threads: 98 Processes: 17

Physical Memory (K) Total: 32,180 Available: 9,296 File Cache: 6,672

Kernel Memory (K) Total: 6,800 Paged: 5,612 Nonpaged: 1,188

Commit Charge (K)
Total: 28,248 Limit: 67,920 Peak: 32,044

Pagefile Space (K) Total: 44,032
Total in use: 9,308 Peak: 9,308

C:\pagefile.sys Total: 44,032
Total in use: 9,308 Peak: 9,308

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Services **Report**

Alerter Stopped (Manual)
C:\ WINN1\System32\services.exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Shared Process
Service Dependencies:
Lanman Workstation
Computer Browser Running (Automatic) C:\ WINN1\System32\services.exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Shared Process
Service Dependencies:
Lanman Workstation
LanmanServer

ClipBook Server Stopped (Manual)
C:\ WINN1\system32\clipsrv .exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Own Process
Service Dependencies:
NetDDE
EventLog (Event log) Running (Automatic)
C:\W INN1\system32\services.exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Shared Process
HP Smart Lock Polling
C:\ WINN1\System32\HPolLock.exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Own Process
Server Running (Automatic)
C:\ WINN1\System32\services.exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Shared Process
Group Dependencies:
TOI
Workstation (NetworkProvider)
C:\ WlNN1\System32\services.exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Shared Process
Group Dependencies:
TDl
Messenger Running (Automatic)
C:\ WINN1\System32\services.exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Shared Process
Service Dependencies:
Lanman Workstation
NetBios
Network DDE (NetDDEGroup)
C:\ WINNT\system32\netdde.exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Shared Process
Service Dependencies:
NetDDEDSDM

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Network DDE DSDM
C:\ WlNNT\system32\netdde.exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Shared Process
Net Logon (RemoteValidation) Stopped (Manual) C:\ WINN1\System32\1sass.exe
Service Account Name: LocalSystem

Stopped (Automatic)

Running (Automatic)

Stopped (Manual)

Stopped (Manual)

Error Severity: Nom1al
Service Flags: Shared Process
Service Dependencies:
Lanman Workstation
NT LM Security Support Provider Stopped (Manual) C:\ WINN1\System32\SERVICES.EXE
Service Account Name: LocalSystem
Error Severity: Nom1al
Service Flags: Shared Process
Plug and Play (plugPlay)
C:\ WINNnsystem32\services.exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Shared Process
Directory Replicator - -
C:\ WINN1\System32\ImrepI.exe
Service Account Name: LocalSystem
Error Severity: Nom1al
Service Flags: Own Process
Service Dependencies:
Lanman Workstation
LanmanServer
Remote Procedure Call (RPC) Locator
C:\ WINN1\System32\LOCA TOREXE
Service Account Name: LocaISystem
Error Severity: Normal
Service Flags: Own Process
Service Dependencies:
Lanman Workstation
Rdr
Remote Procedure Call (RPC) Service
C:\ WINNnsystem32\RpcSs.exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Own Process
Schedule Stopped (Manual)
C:\ WINN1\System32\AtSvc.Exe
Service Account Name: LocalSystem
Error Severity: Normal
Service Flags: Own Process
Spooler (SpoolerGroup)
C:\ WINNT\system32\spoolss.exe
Service Account Name: LocalSystem
Error Severity: Nom1al
Service Flags: Own Process, Interactive
Telephony Service Stopped (Manual)

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C:\ WINNT\system32\tapisrv .exe
Service Account Name: LocalSystem
Error Severity: Nonnal
Service Flags: Own Process
UPS Stopped (Manual)
C:\ WINN1\System32\ups.exe
Service Account Name: LocalSystem
Error Severity: Normal

Running (Automatic)

Stopped (Manual)

Stopped (Manual)

Running (Automatic)

Running (Automatic)

Service Flags: Own Process

Drivers Report

Abiosdsk (Primary disk)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
ADlSND (Base) Running (System)
C:\ WlNN1\System32\drivers\ADISND.SYS
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
AFD Networking Support Environment (TDl) Running (Automatic) C:\ WlNN1\SyStem32\drivers\afd.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
AhaI54x (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Ahal74x (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
aic78xx (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Always (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
amiOnt (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
amsint (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Arrow (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
AspiXNT Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
atapi (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

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Atdisk (Primary disk) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
ati (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Beep (Base) Running (SyStem)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
BusLogic (SCSI miniport) Stopped (Disabled)

Stopped (Disabled)

Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Busmouse (Pointer Port) Stopped (Disabled) Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Cdaudio (Filter) Stopped (System)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Cdfs (File system) Running (Disabled)
Error Severity: Normal
Service Flags: File System Driver, Shared Process
Group Dependencies:
SCSI CDROM Class
Cdrom (SCSI CDROM Class) Running (System) Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Group Dependencies:
SCSI miniport
Changer (Filter) Stopped (System)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
cirrus (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
cl546x (Video) Running (System)
S ys tem3 2 \D RIVERS\c 15 46 xm. sys
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Cpqarray (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
cpqfws2e (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
dac960nt (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
dce376nt (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Delldsa (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Dell_DGX (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Disk (SCSI Class) Running (Boot)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Group Dependencies:
SCSI miniport
Diskperf (Filter) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

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DptScsi (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
dtc329x (SCSI miniport) Stopped (Disabled)
Error Severity: NofDlal
Service Flags: Kernel Driver, Shared Process
et4000 (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Fastfat (Boot file system) Running (Disabled)
Error Severity: NofDlal
Service Flags: File System Driver, Shared Process
FdI6_700 (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Fd7000ex (SCSI miniport) Stopped (Disabled)
Error Severity: NofDlal
Service Flags: Kernel Driver, Shared Process
Fd8xx (SCSI miniport) Stopped (Disabled)
Error Severity: NofDlal
Service Flags: Kernel Driver, Shared Process
flashpnt (SCSI miniport) Stopped (Disabled)
Error Severity: NofDlal
Service Flags: Kernel Driver, Shared Process
Floppy (Primary disk) Running (System)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Ftdisk (Filter) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
HPGate (Extended Base) Running (System)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
hpPwmlDE (Extended Base) Running (Automatic)
system3 2\0 RlVERS\h p PwmID E. sys
Error Severity: NofDlal
Service Flags: Kernel Driver, Shared Process
i8042 Keyboard and PS/2 Mouse Port Driver (Keyboard Port) Running (System) System3 2\0 RlVERS\i804 2prt. sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Inport (Pointer Port) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Jazzg300 (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Jazzg364 (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Jzvx1484 (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Keyboard Class Driver (Keyboard Class) Running (System)

System 3 2 \D RIV ERS\kbdc lass. sys
Error Severity: Nonnal
Service Flags: Kernel Driver, Shared Process
KSecDD (Base) Running (System)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
mga (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
mga_mil (Video) Stopped (Disabled)

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Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
mitsumi (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
mkecr5xx (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Modem (Extended base) Stopped (Manual)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Mouse Class Driver (pointer Class) Running (System) System32 \D RIVERS\m 0 uc lass. sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Msfs (File system) Running (System)
Error Severity: Nonnal
Service Flags: File System Driver, Shared Process
Mup (Network) Running (Manual)
C:\ WINN1\System32\drivers\mup.sys
Error Severity: Nonnal
Service Flags: File System Driver, Shared Process
NetBEUI Protocol (PNP_illI) Running (Automatic) C:\ WINN1\System32\drivers\nbf.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Ncr53c9x (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
ncr77c22 (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Ncrc700 (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Ncrc710 (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Microsoft NDIS System Driver (NDIS) Running (System) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
NetBIOS Interface (NetBIOSGroup) Running (Manual) C:\ WINN1\System32\drivers\netbios.sys
Error Severity: Normal

Service Flags: File System Driver, Shared Process
Group Dependencies:
TDI
NetDetect Stopped (Manual)
C: \ WINN1\system3 2\dri v ers \n etdtect.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Npfs (File system) Running (System)
Error Severity: Normal
Service Flags: File System Driver, Shared Process
Ntfs (File system) Stopped (Disabled)
Error Severity: Normal
Service Flags: File System Driver, Shared Process
Null (Base) Running (System)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
NWLink IPx/SPX Compab"ble Transport Protocol (PNP _TDI) Running (Automatic) C:\ WINNT\System32\drivers\nw Inkipx.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
NWLink NetBIOS (PNP _TDI) Running (Automatic)
C:\ WINN1\System32\drivers\nwlnknb.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Service Dependencies:
NwInkIpx

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NWLink SPx/SPXII Protocol Running (Manual)
C:\ WINNT\System32\drivers\nwlnkspx.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Service Dependencies:
Nw1nkIpx
Oliscsi (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Parallel (Extended base) Running (Automatic)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Service Dependencies:
Parport
Group Dependencies:
Parallel arbitrator
Parport (Parallel arbib"ator) Running (Automatic)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
ParVdm (Extended base) Running (Automatic)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Service Dependencies:
Parport
Group Dependencies:
Parallel arbitrator
PCIDump (pcI Configuration) Stopped (System)
Error Severity: Ignore

Service Flags: Kernel Driver, Shared Process
Pcmcia (System Bus Extender) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
HP Edlernet Family Adapter Driver (NOIS) Running (Automatic) C:\ WINN1\System32\drivers\pcntn4m.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
piixide (SCSI miniport) Running (Boot)
C:\ WINN1\syStem32\drivers\piixide.sys
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
PoP ISA Enabler Driver (Base) Stopped (System)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
psidisp (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
QIIOwnt (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
qv (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Rdr (Network) Running (Manual)
C:\ WINN1\System32\drivers\rdr .sys
Error Severity: Normal
Service Flags: File System Driver, Shared Process
s3 (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Scsiprnt (Extended base) Stopped (Automatic)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Group Dependencies:
SCSI miniport

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scsipwr (Filter) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Scsiscan (SCSI Class) Stopped (System)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Group Dependencies:
SCSI miniport
Serial (Extended base) Running (Automatic)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Sermouse (pointer Port) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Sfloppy (Primary disk) Stopped (System)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Group Dependencies:

SCSI miniport
Simbad (Filter) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
slcd32 (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Sparrow (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Spack (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Srv (Network) Running (Manual)
C:\ WINN1\System32\drivers\srv .sys
Error Severity: Normal
Service Flags: File System Driver, Shared Process symc810 (SCSI miniport) Stopped (Disabled)
Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
SymPwr (Filter) Stopped (Disabled) Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
TI28 (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Tl3B (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
tga (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
tmvI (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Ultral24 (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Ultra14f (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
Ultra24f (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process
v7vram (Video) Stopped (Disabled) Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
VgaSave (Video Save) Running (System) C:\ WINN1\System32\drivers\vga.sys
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
VgaStart (Video Init) Stopped (System)
C:\ WINN1\System32\drivers\vga.sys
Error Severity: Ignore

Service Flags: Kernel Driver, Shared Process
Wd33c93 (SCSI miniport) Stopped (Disabled) Error Severity: Normal
Service Flags: Kernel Driver, Shared Process

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wd9Oc24a (Video) Stopped (Disabled) Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
wdvga (Video) Stopped (Disabled) Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
weitekp9 (Video) Stopped (Disabled) Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process
Xga (Video) Stopped (Disabled)
Error Severity: Ignore
Service Flags: Kernel Driver, Shared Process

IRQ and Port Report

Devices
i8042prt i8042prt Serial
Serial
Serial
Seria1
Serial ADISND ADISND Floppy PCNTN4M piixide piixide

Devices
i8042prt i8042prt Parport Serial Serial Serial Serial Serial ADISND ADISND ADISND ADISND Floppy Floppy HPGate

Vector Level Affinity

I 0xffffffff
12 12 0xffffffff
4 4 0x00000009
11 11 0x00000000
11 11 0x00000000
11 11 0x00000000
11 11 0x00000000
55 7 0x00000001
53 5 0x00000001
6 6 0x00000000
3 3 0x00000000
0 14 0x00000000
0 15 0x00000000

Physical Address Lengdt
. 0-
_OxOOOOOO60 OxOOOOOOOOO I OxOOOOO064 OxOOOOOOOOOI OxOOOO0378 OxOOOOOOOOO3
OxOOOOO3f8 OxOOOOOOOOO7 OxOOOOO300 OxOOOOOOOO07 OxOOOO0308 OxOOOOOOOO07 OxOOOO0310 OxOOOOOOOO07
OxOOOOO318 OxOOOOOOOOO7
OxOOOOO I 00 OxOOOOOOOO02 OxOOOO0388 OxOOOOOOOO04 OxOOOOO200 OxOOOOOOOOO8 OxOOOOOl30 OxOOOOOOOOlO
OxOOOOO3fl> OxOOOOOOOO06 OxOOOOO3f7 OxOOOOOOOOOl OxOOOOO070 OxOOOOOOOOO2

hpPwmillE PCNTN 4 M piixide piixide piixide piixide VgaSave VgaSave VgaSave

OxOOOOOlfl) OxOOOOOOOOO8 OxOOOOfccO OxOOOOOOOO20
OxOOOOOlfl) OxOOOOOOOOO8 OxOOOOfcbO OxOOOOOOOOO8 OxOOOOOl70 OxOOOOOOOOO8 OxOOOOfcb8 OxOOOOOOOO8
OxOOOOO3bO OxOOOOOOOOOc OxOOOOO3cO OxOOOOOOOO20 OxOOOOOlce OxOOOOOOOOO2

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DMA and Memory Report

Devices	Channel	Port
ADISND	1	0
ADISND	3	0
Floppy	2	0

Devices	Physical Address	Length
cl546x	0xfece0000	0x00008000
cl546x	0xfe000000	0x02000000
VgaSave	0x000a0000	0x00020000

Environment Report

System Environment Variables
ComSpec=C:\ WINN1\system32\cmd.exe
Os2LibPath=C:\ WINN1\system32\os2\dll;
Path=C:\ WINN1\system32;C:\ WINNT
windir--C:\ WINNT
OS= Windows_NT
PR aCE S SO R_AR CHITECTURE =x86
PROCESSOR_LEVEL=6
PROCESSOR_illENTIFIER=x86 Family 6 Model 3 Stepping 3, GenuineIntel PR OCESSO R_REVISION=O303
NUMBER_OF _PROCESSORS= 1

Environment Variables for Current User TEMP=C:\ TEMP
TMP=C: \ TEMP

Network Report

-

Your Access Level: Admin & Local Workgroup or Domain: WORKGROUP Network Version: 4.0
LanRoot: WORKGROUP
Logged On Users: 1
Current User (1): Administrator
Logon Domain: BOHDAN
Logon Server: BOHDAN

Transport: Nbf_PCNTN4Ml, 00-60-BO-AI-E6-AD, VC's: 0, Wan: Wan Transport: NwlnkNb, 0O-60-BO-AI-E6-AD, VC's: 0, Wan: Wan

Character Wait: 3,600
Collection Time: 250
Maximum Collection Count: 16
Keep Connection: 600
Maximum Commands: 5
Session Time Out: 45
Character Buffer Size: 512
Maximum Threads: 17
Lock Quota: 6,144
Lock Increment: 10
Maximum Locks: 500
Pipe Increment: 10
Maximum Pipes: 500
Cache Time Out: 40
Dormant File Limit; 45
Read Ahead Throughput: 4,294,967,295 Mailslot Buffers: 3
Server Announce Buffers: 20
Illegal Datagrams: 5
Datagram Reset Frequency: 60

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Log Election Packets: False
Use Opportunistic Locking: True
Use Unlock Behind: True
Use Close Behind: True
Buffer Pipes: True
Use Lock, Read, Unlock: True
Use NT Caching: True
Use Raw Read: True
Use Raw Write: True
Use Write Raw Data: True
Use Encryption: True
Buffer Deny Write Files: True
Buffer Read Only Files: True
Force Core Creation: True
512 Byte Max Transfer: False
Bytes Received: 269
5MB's Received: 3
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0 Cache Read Bytes Requested: 0 Network Read Bytes Requested: 0

Bytes Transmitted: 481
5MB's Transmitted: 3
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0 Cache Read Bytes Requested: 0 Network Read Bytes Requested: 0 Initally Failed Operations: 0
Failed Completion Operations: 0 Read Operations: 0
Random Read Operations: 0
Read 5MB's: 0
Large Read 5MB's: 0
Small Read 5MB's: 0
Write Operations: 0
Random Write Operations: 0
Write 5MB's: 0
Large Write 5MB's: 0
Small Write 5MB's: 0
Raw Reads Denied: 0
Raw Writes Denied: 0
Network Errors: 0
Sessions: 1
Failed Sessions: 0
Reconnects: 0
Core Connects: 0
LM 2.0 Connects: 0
LM 2.x Connects: 0
Windows NT Connects: 1
Server Disconnects: 0
Hung Sessions: 0
Use Count: 0
Failed Use Count: 0
Current Commands: 0
Server File Opens: 0
Server Device Opens: 0
Server Jobs Queued: 0
Server Session Opens: 0
Server Sessions Timed Out: 0
Server Sessions Errored Out: 0 Server Password Errors: 0
Server Permission Errors: 0
Server System Errors: 0
Server Bytes Sent: 269
Server Bytes Received: 481
Server Average Response Time: 0 Server Request Buffers Needed: 0 Server Big Buffers Needed: 0

Appendix C

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A WS Customer Comment Form

A copy of the "A WS Customer Comment Form" is enclosed in this section. This form is to be filled out and submitted to the Bohdan service representative when reporting a problem with the Workstation or application software.

C-J. Manual. 8/97

A WS Customer Comment Form

Model #:_____ Serial #:
Customer:_____
Date:_____ Operator:

Problem description:

-

11. Function executed (main menu selection) :

12. **Screen leveVtitle/description**

13. A **WS action (arm position, gripper position, slides,** etc.) :

14. **Peripherals involved (pH meter, balance,** etc.) :

15. **Problem description**

16. **Action requested**

17. **Date needed:**

A WS Customer Comment Form

Model #:_____ Serial #
Customer:_____
Date:_____ Operator

Problem descrip~n:

-

Function executed (main menu selection) :

2. **Screen level/title/description**

3. A **WS action** (arm **position, gripper position, slides,** etc.)

4. Peripherals involved (pH meter, balance, etc.)

5. Problem description

6. **Action requested**

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7. Date needed

Appendix D

A WS Consumable List

A list of the A WS Consumables is enclosed in this section. This list to be used for convenient reference when reordering consumables.

Bohdan Part Number 1323-03-01
1323-04-04
1323-01-04
555-1323-2
555-1323-1
555-1323-3 520-0052~ 505-0002
505-0006 .
740-O002A
740-0013
254-0074
254-0081
254-0008 254-0007
254-0040
254-0085
254-0087

~scription

I Vial Rack

l~p Well Plate Chiller Cov~

Cannula Holder Cannula Body Cannula Head, 0.2 mL Cannula Head, 1.0 mL

4L Vacuum ~~ Heavy Wall Coated

0..25 mL Syringe

lOin(Syrin~

I Syringe Drive, Standar~

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I 3- W1ayS~~ye

Tubing, Teflon Convoluted 3!~

Tubing~~~~onvoluted 112m

~ubing, Teflon 5/320D x 3/3~

--

Tubin~~':Jn 1/80D x 1/16ill

Tubing, Teflon 1/40D x 118m

Tubin~!~ 85Durometer

Tubing, Tygon 1/800 x 112m

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