

# Mercury Service Manual



GRAPHIC  
MEASUREMENTS  
INC.

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# 1 Introduction

This manual is a guide to servicing the Mercury system for narrow web presses.

It assumes familiarity with the *Mercury Training & User's Guide*, *Mercury Advanced User's Manual*, and system operation.

**NOTE:** Notes contain specific information. They may explain why a certain step should be performed. Sometimes they contain tips about a particular step in a process.

**WARNING:** Warnings indicate a potentially hazardous situation.

## Helpful Hint

Helpful Hints may appear at the end of sections. They contain tips on how to use the Mercury system more effectively

## 2 Mercury System

### 2.1 Mercury System Installation

#### 2.1.1 Warnings

**WARNING:** Installation and use of this equipment is restricted to a non-explosive atmosphere. In case the equipment is integrated into a printing press that uses solvents, the integrator will be responsible for installation of the equipment outside the zone rated: Zone 1 or Zone 2 (ATEX rating).

**ATTENTION:** The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations to use which must be observed when the product is taken into service, to maintain compliance with the directives indicated in the EU [Declaration of Conformity](#). Details of these special methods and limitations are available on request, and are also contained in the product manuals and installation procedures. Moreover, this equipment must not be put into service until the machinery into which it is incorporated has been declared in conformity with the provision of all other relevant EU directives.



**WARNING:** Warning labels as shown at left indicate electric shock hazard zones on the equipment. **DO NOT** remove guards or place hands in these locations at any time that power is applied.



**WARNING:** Warning labels as shown at left indicate that you should refer to detailed instructions in the equipment Installation and Service Manual before making access to this area or attempting to perform service.



**WARNING:** Warning labels as shown at left indicate that there are no user serviceable parts inside. Customer Service can assist you if system components need to be exchanged or replaced.

## 2.1.2 Manufacturer's Information

Company: Graphic Measurements  
Address: 1207 Beta Court, Rockwall Tx 75087  
Toll Free – 1 844.464.7782 (844-GMI-SRVC)

Product Description: Remote Ink Control System for the Printing Industry  
Product Name: Mercury  
System Part Numbers: 090G100XXX-YY  
Where:  
XXX = Server Hardware Type Configuration  
YY = Interface Control Type Configuration  
System Serial Numbers: N7168 thru 99999  
Product Classification: Remote ink control system for Printing Industry  
Product Environment: Light Industrial (Support Equipment)  
Industrial (Systems)



**Mercury System Label**



## 2.1.3 Dimensions / Weight / Power Requirements

The full system varies based on press configuration and number of print units.

### Mercury 2U Server/Client

**Dimensions:**

**Width:** 19 inches (482 mm)  
**Height:** 3.46 inches (88 mm)  
**Depth:** 18.9 inches (480 mm)

**Weight:** 25.7 lbs. (11.7 kgs.)

**Power Requirements:**

115 /230VAC (+/-10%), 50/60 Hz, 400W

### Mercury 1U Server/Client

**Dimensions:**

**Width:** 19 inches (482 mm)  
**Height:** 1.7 inches (44 mm)  
**Depth:** 19.6 inches (497 mm)

**Weight:** 17.6 lbs. (8 kgs.)

**Power Requirements:**

115 /230VAC (+/-10%), 50/60 Hz, 400W

### Servo Power Unit

**Dimensions:**

**Width:** 12 inches (304 mm)  
**Height:** 12 inches (304 mm)  
**Depth:** 7 inches (177.8 mm)

**Weight:** 18 lbs. (8.2 kgs.)

**Power Requirements:**

115 /230VAC (+/-10%), 50/60 Hz, 300W

### UPS

**Dimensions:**

**Width:** 3.60 inches (91.4 mm)  
**Height:** 6.50 inches (165 mm)  
**Depth:** 11.20 inches (284 mm)

**Weight:** 12.5 lbs. (5.68 kgs.)

**Power Requirements:**

115 /230VAC (+/-10%), 50/60 Hz, 350VA

### 22" LCD Touchscreen Display

**Dimensions:**

**Width:** 21.7 inches (551 mm)  
**Height:** 15.4 inches (392 mm)  
**Depth:** 7.6 inches (193 mm)

**Weight:** 16.5 lbs. (7.5 kgs.)

**Power Requirements:**

115 /230VAC (+/-10%), 50/60 Hz, 30W

### 32" LCD Touchscreen Display

**Dimensions:**

**Width:** 30.0 inches (763 mm)  
**Height:** 18.0 inches (457.3 mm)  
**Depth:** 2.4 inches (61.6 mm)

**Weight:** 35.8 lbs. (17.47 kgs.)

**Power Requirements:**

115 /230VAC (+/-10%), 50/60 Hz, 55W

### OCU3 44 Zone Options

**Dimensions:**

**Width:** 41 inches (1041 mm)  
**Height:** 3.5 inches (89 mm)  
**Depth:** 9 inches (228.6 mm)

**Weight:** 30 lbs. (13.6 kgs.)

**Power Requirements:**

115 /230VAC (+/-10%), 50/60 Hz, 150W

### PLC 10I / 200 Option

**Dimensions:**

**Width:** 13.80 inches (350.5 mm)  
**Height:** 5.50 inches (140 mm)  
**Depth:** 10.00 inches (254 mm)

**Weight:** 11.0 lbs. (4.98 kgs.)

**Power Requirements:**

115 /230VAC (+/-10%), 50/60 Hz, 150W

**Noise pressure level at operators station:** < 70dB(A)

## 2.1.4 Intended Operating Environment

This provides justification for use in an industrial environment.

### Operating Environment

Advanced Vision Technology products are designed to operate in an industrial environment used for printing presses and similar equipment.

Temperature: 32 to 122 °F, 0 to 50 °C  
Relative Humidity: 20-80% RH non-condensing

### Storage Environment

If any Advanced Vision Technology products or any sub-systems require temporary storage in an area other than its operating environment, the following should be maintained.

Temperature: -4 to 140 °F, -20 to 60 °C  
Relative Humidity: 5 to 90% RH non-condensing

### Limitations in Intended Operating Environment

Metal covers are provided to protect all on-press electronics and mechanical interconnects. These metal covers prevent contamination for the product and related components. Contamination includes dirt, dust, moisture, ink, solvents and oil. Full product warranty requires mandatory use of these covers at all times, except for calibration and service functions.

## 2.2 Overview of Mercury System

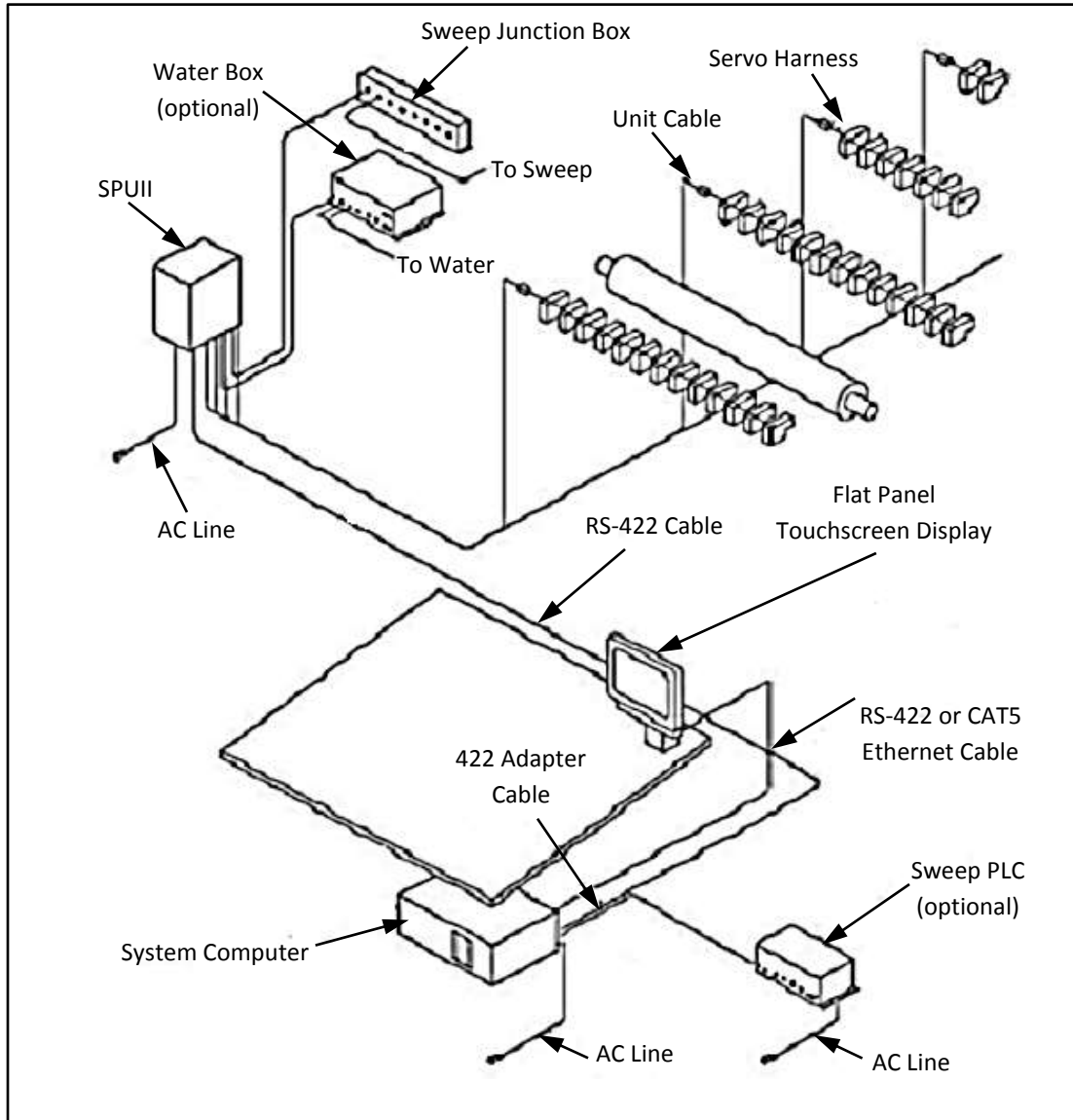


Figure 2.1: Mercury System

### Maintenance

The Mercury system requires little maintenance.

To clean the touchscreen, use window or glass cleaner. Put the cleaner on a soft cloth and wipe the touchscreen. Never apply the cleaner directly on the touchscreen.

As the ink fountain blades wear, you may need to recalibrate the fountains.

## Servicing the Mercury System



Customer Service can assist you if system components need to be exchanged for a loaner or replaced. Most AVT components contain no serviceable parts, as indicated by this label.

**WARNING:** Servo motors are permanently lubricated at the factory. Do NOT oil the servos as this may cause the motors to stop working due to contamination. The servo will not run after this happens.

Do NOT clean the servos with solvents. Solvents may contaminate the gear train resulting in permanently reduced torque. Servo communication errors also may occur until the servos and harness are dry.

## 2.3 System Computer Connections

The following figure shows the back of the Mercury system computer, with the connections labelled.

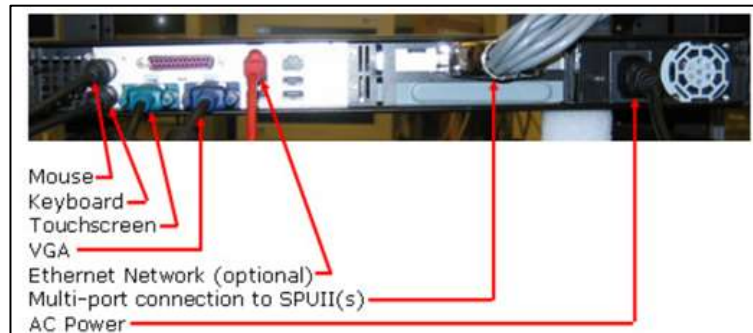


Figure 2.2: Mercury System Computer (rear panel)

**NOTE:** Use of the PC keyboard is no longer allowed when operating the Mercury workstation application. You must use the touch screen interface.

## 2.4 SPU Troubleshooting

### LED Indicator Lights

Three LED indicator lights can be seen through the viewing window on top of the SPU.

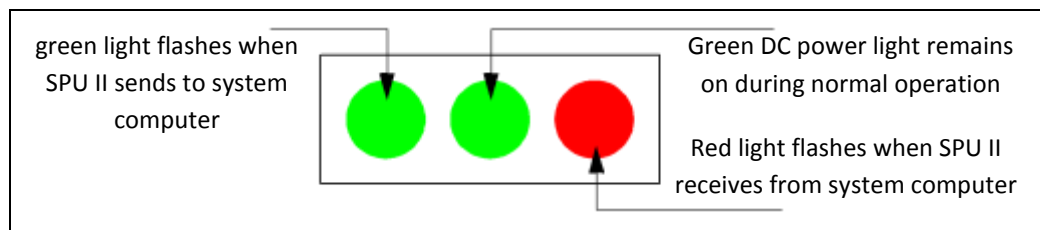


Figure 2.3: LED Indicator Lights on SPU

The power switch on the SPU rear panel also contains a green light. This light should remain on during normal operation. It indicates that there is AC power within the SPU.

## SPU Communication Problems

If the computer does not properly communicate with the SPU, Mercury will display the following screen.



If the problem continues, it may be due to one of the following problems:

<b>SPU Green Power Light is Off</b>	Make sure that the circuit powering the SPU and the power switch are both on. If they are both on, unplug the power cord or turn off the circuit breaker. Then check the fuse on the circuit board inside the SPU.
<b>Power Problem</b>	There was a temporary electrical line noise on the RS-422 cable. The SPU momentarily lost or does not have power.
<b>Cable Problem</b>	The RS-422 cable that goes between the computer and the SPU may be damaged or disconnected.  Check the cable connections. If there is more than one SPU, swap RS-422 cables at the back of the computer and/or the SPU to isolate the problem to the computer, cable, or SPU. Make sure the cables are labelled before swapping them so that they can be put back in their original configuration.
<b>Short Circuit or Load Problem</b>	The SPU was reset by an excessive load or short circuit on a cable, servo, sweep, or water. See <a href="#">Troubleshooting a Short Circuit</a> .

If the SPU Timeout message appears after troubleshooting, see [Running SPU Test](#).

You can access the SPU test from the **Mercury System > Diagnostics** menu.

## 2.5 SPU Replacement

If the SPU is plugged into a dedicated outlet with a power cord, zero the press and unplug the SPU before proceeding.

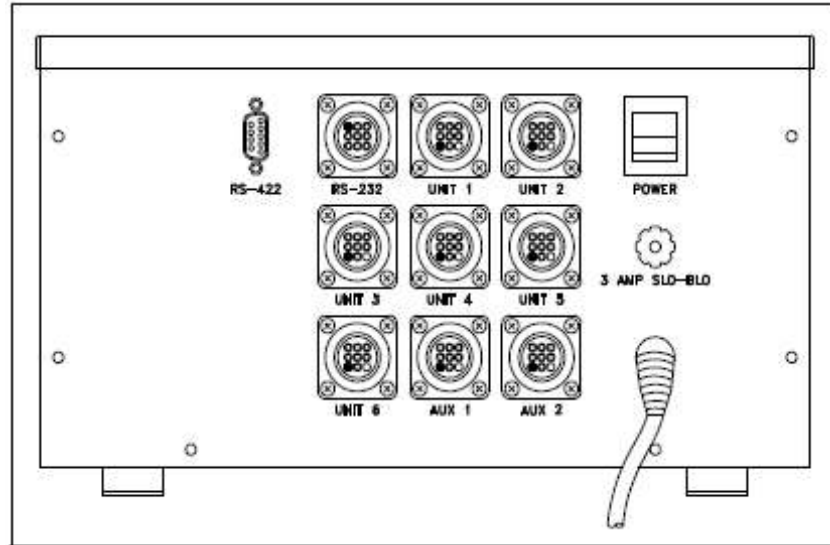


Figure 2.4: SPU II (rear panel)

1	Remove the RS-422 and unit cables by turning the black locking ring on the connectors. Make sure that they are properly labeled so they will be placed back onto the same respective connectors.
2	Install the new SPU in reverse order of removal, making sure that all cables and connections are secure and properly installed before turning on the power.

## 2.6 Unit and Sweep Cables and Servo Harness

### Unit and Sweep Cables

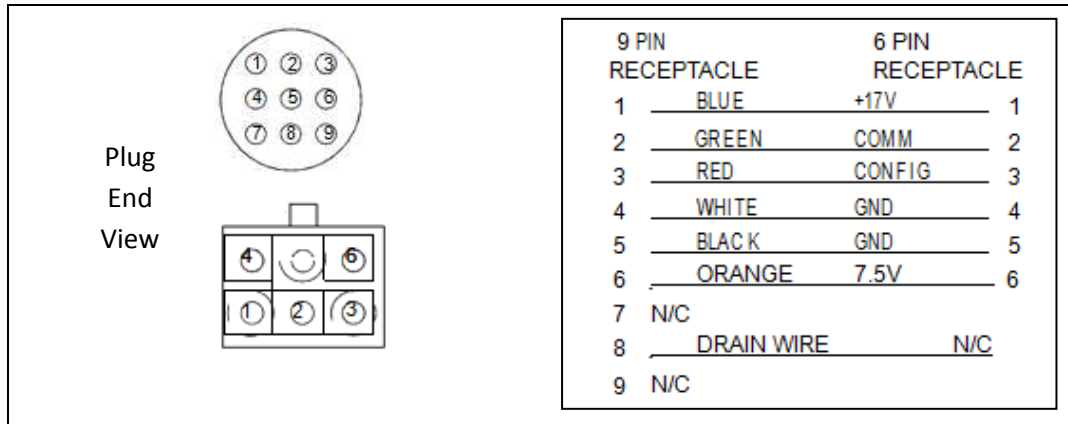


Figure 2.5: Unit Cable and Sweep Cable (P/N 050G200013-XX)  
Pinout and Wire Diagram

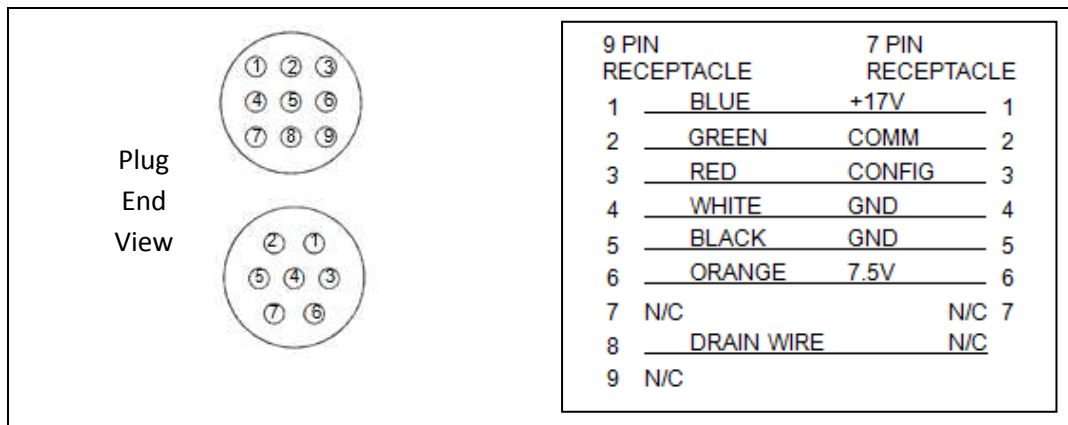


Figure 2.6: Unit Cable (P/N 050G200150-XX) Pinout and Wire Diagram

## Cable Lengths

Cable length directly effects servo and sweep move time performance. The **shortest cable** possible provides the **best results**. A shorter cable delivers more available voltage (due to lower resistance) to the motor and thus a quicker setting time.

Cable Length in Feet	Unit Cable– Standard Part Number	Unit Cable – Sealed Connector Part Number	Sweep Cable – Standard Part Number	Sweep Cable – Extension Part Number
5	050G200013-05	050G200150-01	050G200013-15	050G200032-01
10	050G200013-06	050G200150-02	050G200013-16	050G200032-02
15	050G200013-01	050G200150-03	050G200013-11	050G200032-03
20	050G200013-02	050G200150-04	050G200013-12	050G200032-04
25	050G200013-03	050G200150-05	050G200013-13	050G200032-05
30	050G200013-04	050G200150-06	050G200013-14	050G200032-06
35	050G200013-07	050G200150-07	050G200013-17	050G200032-07
40	050G200013-08	050G200150-08	050G200013-18	050G200032-08
45	050G200013-09	N/A	N/A	050G200032-09
50	050G200013-50	N/A	N/A	050G200032-10
55	050G200013-55	N/A	N/A	N/A
60	050G200013-60	N/A	N/A	N/A
9	N/A	050G200150-09	N/A	N/A
11	N/A	050G200150-11	N/A	N/A
12	N/A	050G200150-12	N/A	N/A
13	N/A	050G200150-13	N/A	N/A
14	N/A	050G200150-14	N/A	N/A
16	N/A	050G200150-16	N/A	N/A
17	N/A	050G200150-17	N/A	N/A
18	N/A	050G200150-18	N/A	N/A
19	N/A	050G200150-19	N/A	N/A



## Servo Harness

Each unit cable connects the SPU to a servo harness. The servo harness connects each servo on the bank in a series. A maximum of 44 servos can be connected to one harness. Presses with more than 44 keys have two harnesses per fountain.

- The wire from pin 1 of one connector goes to pin 2 of the next. An extra ground wire runs the length of the harness and connects at the last servo connector.

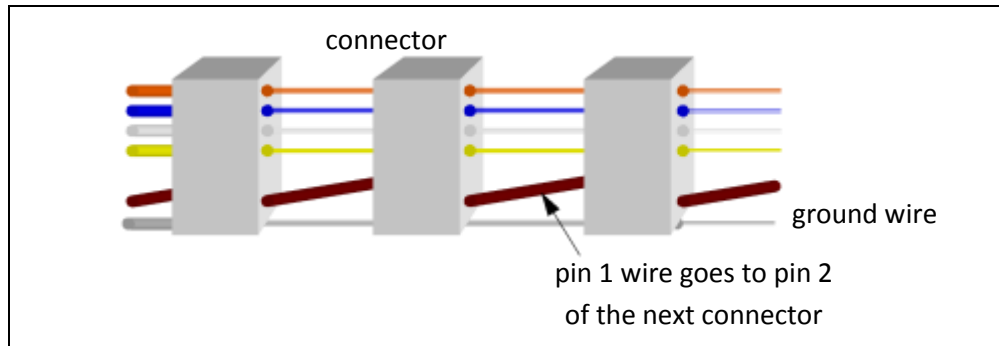


Figure 2.7: Servo Harness

- During testing, servos are always numbered with Servo 1 nearest to the unit cable connection.

**NOTE:** For information about how to replace a servo, see the *Mercury Advanced User's Manual*.

## 2.7 Other Cables and Wire Diagrams

### SPU to Sweep Junction Box Cable and Sweep Extension Cable

The maximum length of the SPU to sweep junction box cable is three feet. Pinouts are the same for the L38 sweep extension cable.

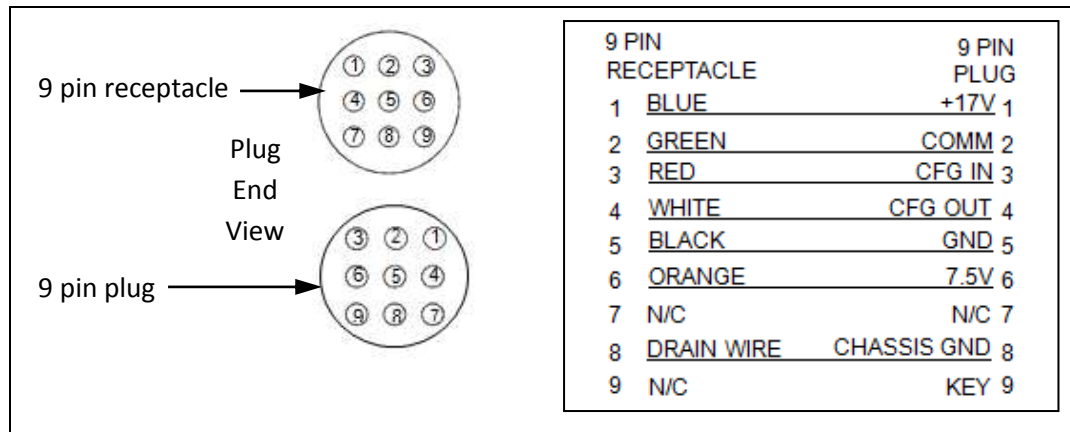


Figure 2.8: SPU to Sweep Junction Box (P/N 050G200128) and Sweep Extension Cable (P/N 050g200032-xx) Pinout and Wire Diagram

## RS-422 Cable

The RS-422 cable connects the system computer to the SPU. This 050G200154-XX cable comes in several lengths, from 15 ft thru 300 ft. The table below has a listing of lengths with part numbers and includes the wiring diagram.

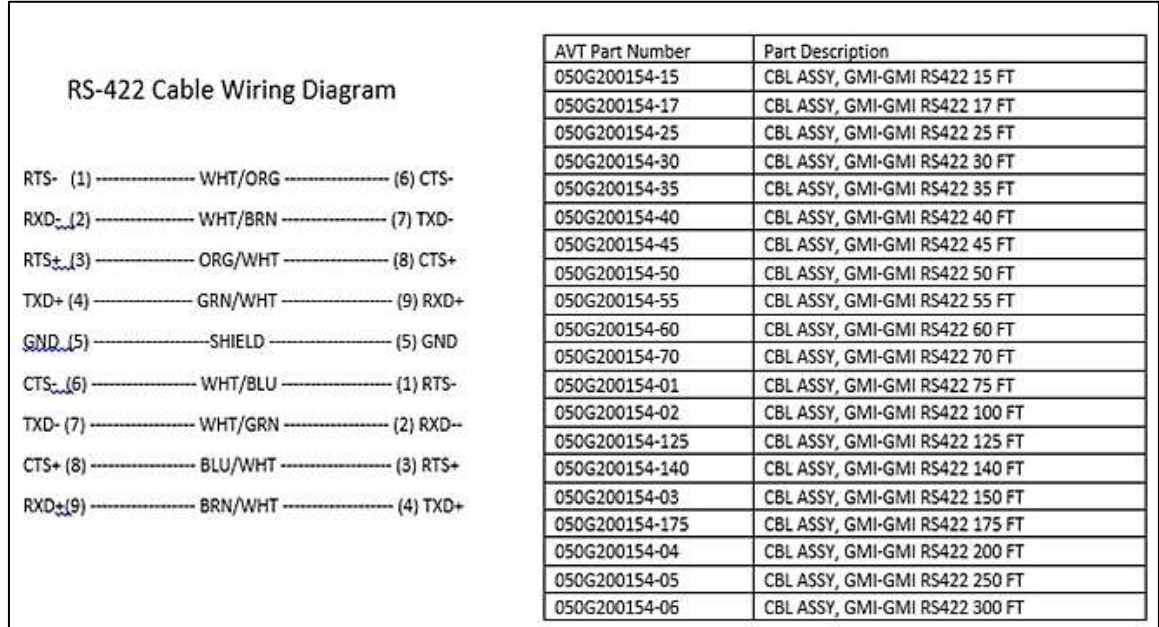
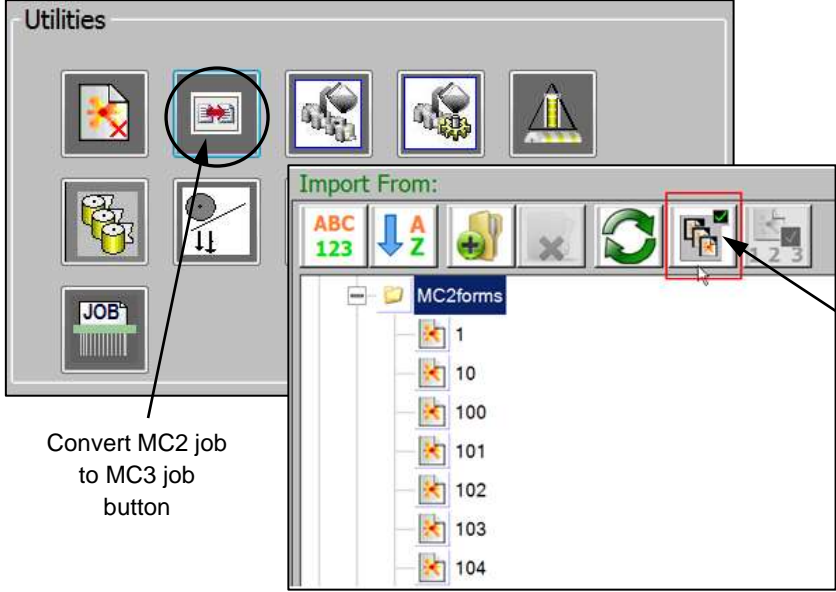


Figure 2.9: RS-422 Wire Diagram and Part Numbers

### 3 Mercury Configuration and Migration

#### 3.1 MC2 Job to MC3 Job Conversion

Mercury supports conversion of most versions of MCII and MCI. You should convert forms from Microcolor II only if Mercury is replacing the Microcolor II.

<p><b>1</b></p>	<p>Touch the <b>Convert MC2 job to MC3 job</b> button under the Utilities section of the Mercury Configuration view.</p> <p>The Import Form screen displays where you can search for a form on all available drives.</p>  <p>Convert MC2 job to MC3 job button</p> <p>Select All Forms button</p>
<p><b>2</b></p>	<p>Touch the <b>drive letter</b> you want to search from the <b>Import From</b> list. You can expand and collapse the folders as you would normally do in Windows.</p> <p>Currently the import operation covers MC2 forms with file extensions of .J0L, .J0J, and .J0K. The numerical names of the MC2 forms are used to name the files of the imported forms.</p>
<p><b>3</b></p>	<p>Click on <b>Select All Forms</b> button to import all forms on a disk or folder at one time. Using this button highlights the entire contents of a single folder or drive.</p>

#### NOTES:

- The Select All Forms option will only work on one folder at a time and this folder should contain the older form files.
- To import MC2 job files from disk, you will need to use the USB floppy drive to copy MC2 job files from an MC2 data diskette to another USB drive on your laptop. Insert the USB drive into the Mercury system and click on the **Select All Forms** button to import the files on the USB drive to the folder you select.

### 3.2 Password Protection on Mercury Configuration View

Several sections on the Mercury Configuration view are password protected.

<b>Utilities</b>	<ul style="list-style-type: none"><li>➤ Delete Forms/Jobs/Webs</li><li>➤ Convert MC2 job to MC3 job</li><li>➤ Current Color Order and Standard Color Order</li><li>➤ Offset Calibration</li><li>➤ CIP3 Paper Scan Calibration</li><li>➤ Retract Servos and Restore Servos</li><li>➤ Turn Bar Configuration</li></ul>
<b>Diagnostics</b>	<ul style="list-style-type: none"><li>➤ Servo Test</li><li>➤ SPU Test</li><li>➤ History</li><li>➤ Auto Test</li><li>➤ Sweep Test</li></ul>
<b>Settings</b>	<ul style="list-style-type: none"><li>➤ Runtime Options</li></ul>
<b>Exit</b>	Exit the application.

Enter a **6-digit password** in Password text box and click **OK** to enable the function.

### 3.3 Command Line Options to Start Applications

There are some keywords that can be used in program shortcuts to start the server and workstation applications.

- These program shortcuts are located in the Windows Desktop and Startup folders. You will find the Windows Startup folder under **Start > All Programs**.
- These keywords are added to the shortcut's properties, in the Target field after the program name. For example:

**C:\GM\MC3\MC3AS\MC3AppServer.exe RUNINKER="none"**

**NOTE:** There must be a space between the program name and keyword, and a space should separate all keywords.

## Application Server Keywords

Keyword	Description
<p><b>RUNINKER="none"</b></p>	<p>This option allows the application server to ignore missing Mercury equipment (digiboard, SPU, servos, etc.). All requests for equipment changes are carried through with success. You can also use an inker name that doesn't exist in the press.</p> <p>Running <u>full simulation</u> mode with this keyword.</p>
<p><b>RUNINKER="<i>inker name</i>"</b></p>	<p>This option allows application server to direct commands to certain equipment which should be connected to Mercury computer. All other requests are passed through with success. Inker description, which is connected, should be named inside quotes exactly as setup in Mercury SiteGen parameters.</p> <p>This option is used for small demo systems with a single rail of servos, SPU, and digiboard.</p> <p>Running <u>partial simulation</u> mode with this keyword.</p> <p><b>NOTE:</b> If the SPUs are configured to some ports on the DIGI and SPUs do not exist, you will see the SPU Initialization failed message.</p>
<p><b>/CPU</b></p>	<p>Assign Mercury Server process to run on CPU0 in a multi-processor system.</p> <p>New Mercury server computers have dual core processors and dual drives in RAID configuration. When number of SPUs being managed by Mercury App Server reaches a certain level (6 and above), the dual core processors start to affect how the communications are working with the SPUs. Each SPU requires its own set of threads and timers. On a dual core computer these processes are individually assigned to the processor with the least load. Rather than being more efficient, it creates all sorts of timing issues which never existed before.</p> <p>Adding /CPU keyword to App Server startup, forces all processes to be assigned to a single processor. Most other apps are running on the other processor. This actually makes the performance of the App Server greater than before.</p> <p>This setting in the computer for each application is called "processor affinity".</p>

Keyword	Description
<b>/LOGDATA</b>	<p>Record the SPU controller messages and other messages, like CIP3 logs, PLC logs, etc.</p> <p>All logs created in the LOGS folder are governed by this keyword, except for the raw data written to SPU_IO* log files when there's communication between MCAS and each SPU.</p>
<b>/LOGIODATA</b>	<p>Record SPU message packets sent to and from the SPU. Raw packet data is written to log files under the LOGS folder and all messages are recorded for each SPU in its own file.</p>
<b>/NILP_RESET</b>	<p>Uses the ADAM Digital Output Zero to send a 24VDC signal to a press PLC. This signal occurs when a form is ended or CIP3 preset is completed.</p>
<b>NOSTRESS</b>	<p>Slow down the SPU handling to reduce the communications failures.</p> <p>When using Advantech Serial card, communication errors occurred or NAK errors may be reported by SPU if multiple fountain operations are performed at one time. Sometimes, SPU response message data was incomplete or partial.</p> <p>May occur when Set Press, Zero All Inkers, or CIP3 Preset operations are performed.</p>
<b>SPU3DEBUG</b>	<p>Keyword to obtain SPU3 special information. Can provide data from unit statistics, such as last current value of rail current, max current value of rail current, number of times rail over current occurred to shut off rail, number of times delay servo commands was used to slow down current used.</p> <p>This information is captured in the SPU logs after each fountain move completion. Reset of SPU3 is triggered after detection of the SPU requiring re-initialization at least 3 times on the same move request. (This is the method for detecting the "out of control" condition of any SPU.)</p>
<b>ISR</b>	<p>Keyword ISR (Ignore SPU Response) will cause App Server to ignore SPU responses during SPU initialization process. Eliminates any confusion between SPU and Mercury Server.</p>

## Workstation Application Keywords

Keyword	Description
<p><b>/IPADDR="MC3AS IP address"</b></p> <p><b>/IPADDR=127.0.0.1</b></p>	<p>This option specifies the IP address of the computer which contains the Mercury application server program that this client program should communicate with.</p> <p>Normally, the address of 127.0.0.1 is used to specify that the application server and client programs are located on the same computer.</p>
<p><b>/OCU3="MC3Client IP address"</b></p> <p><b>/OCU3=172.31.1.51</b></p>	<p>This option specifies the IP address of the Mercury computer's NIC connector, to which the OCU3 is directly connected.</p> <p>If you have more than one NIC card on Mercury Client system, provide any one of the IP addresses of the Mercury Client system.</p> <p>Omit this option on systems which do not have an OCU3 connected. An error prompt is shown if OCU3 is missing.</p>
<p><b>/OCU3LOG</b></p>	<p>Keyword enables logging of messages between Client and OCU3 to be recorded in log file.</p> <p>The log file is named <b>MC3ClientOCU3-xxx.log</b> and would be stored in the LOGS folder.</p>
<p><b>/DEBUGOCU3</b></p>	<p>Keyword turns on additional information (expanded status of the OCU3 console) sent from the OCU3 to the Client.</p> <p>This feature only works with OCU3 firmware 1.30 and later.</p>
<p><b>/LANG=JA</b></p>	<p>This option specifies which language to be used on the Mercury Client. The default language is US English. The initial non-English is Japanese (JA).</p> <p>(This is no longer available in version 1.30+.)</p>
<p><b>/KEYBOARD</b></p>	<p>Allows the PC keyboard to be used, otherwise the PC keyboard is disabled by default.</p> <p>Look for the <b>Circle K</b> on the upper right of Client to see it is turned on. To turn on during runtime, click on the logo area in main Status View and enter master password.</p>

Keyword	Description
<b>/SCR=x</b>	<p>For multi-screen displays, start the application on this secondary screen index.</p> <p>0 is used by default (primary screen).</p>
<b>/LOG</b>	<p>Turns on the logging to <b>MC3Client-to-MC3AS.log</b> (Client-to-AppServer messages).</p>
<b>/DUPLICATE_INKS</b>	<p>Allows any ink to be repeated on the same surface (form).</p> <p>This feature is required for early dual web systems, using a single web configuration.</p> <p>Best used in fixed split web press configurations.</p>
<b>/SWITCH=xxx</b>	<p>Allows a button to appear in the Zone Status view, with the <b>xxx</b> text in the button.</p> <p>This button forces the client background and switches to another application running on the Mercury system (SnapREG, CIP3 OB).</p> <p>Normally the <b>xxx</b> text is <b>Register</b>.</p>
<b>/CIP3OB</b>	<p>Access to the CIP3 client, when the CIP3 On Board is installed.</p> <p>Control is located on System Configuration view.</p>



## 4 Mercury Ethernet Network

Mercury can be connected to an Ethernet gateway, so that AVT Service can obtain diagnostic data and perform updates.

Each computer connects to the network using a network interface card installed in the computer. This card has connectors for the Ethernet cable used with your system. See [System Computer Connections](#).

### 4.1 Cable Description and Technical Specifications

#### Category 5 STP

The standard cable used for horizontal runs of 100 meters or less is Category 5 Shielded Twisted Pair (STP), also known as 10BaseT (P/N 019G400509).

This cable is used for all point-to-point connections of less than 100 meters.

Category 5 Shielded Twisted Pair	
Data Rate	10 Megabits per second (Mbps)
Max. segment length	100 meters (328 feet) total
Attachments per segment	1
Connector type	RJ-45 with 8 pins
Topology	Star configuration with Ethernet switch

### 4.2 Distance and Environment Limits

#### Category 5 STP

The maximum segment length for a Category 5 STP cable is a total of 100 meters (328 feet). This allows 90 meters (295 feet) for each horizontal run, plus 10 meters (33 feet) for connection at the workstation and the Ethernet switch.

To avoid stretching, pulling tension should not exceed 110N (25 lb/ft) for 4-pair cables. The bend radius of installed cable should not exceed four times cable diameter. Avoid sharp bends or kinks in the cable. There should be no splices in the Cat 5 STP cable.

Securely position the Ethernet switch, preferably in one of the AVT equipment cabinets. Do not hang the Ethernet switch from the cabling.

Avoid cable stress caused by:

- Cable twisting during installation.
- Over tightening tie-wraps. These can crimp the cable and affect transmission.
- Tension from suspended cable runs.

## 4.3 Pinouts and Connectors

### Category 5 STP

In the Category 5 STP network, two pairs of the eight wires are used—one pair for data transmit and one pair for data receive. Communications will fail if the two wires of either pair are reversed.

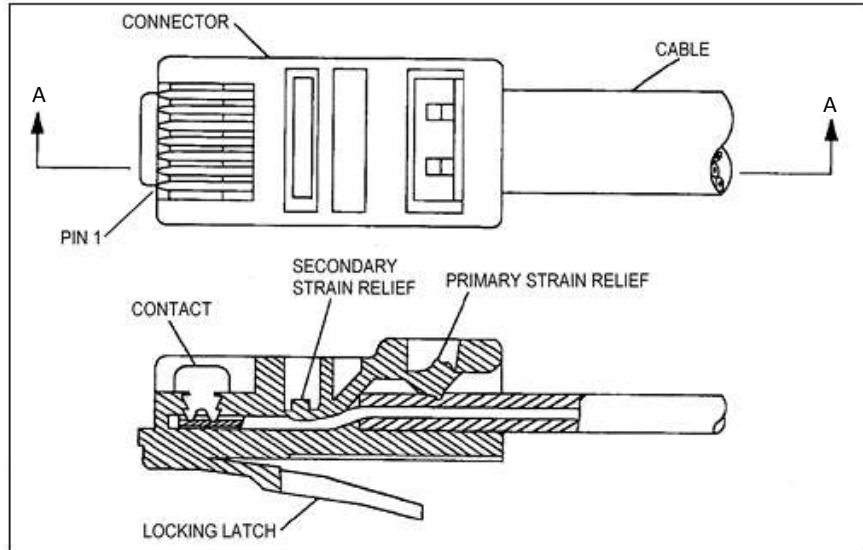


Figure 3.1: RJ-45 Connector (P/N 016G101045)

### Category 5 STP Pinouts for RJ-45 Connectors Table

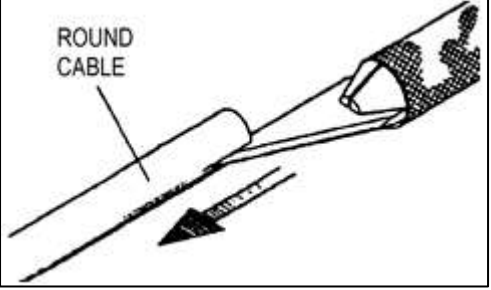
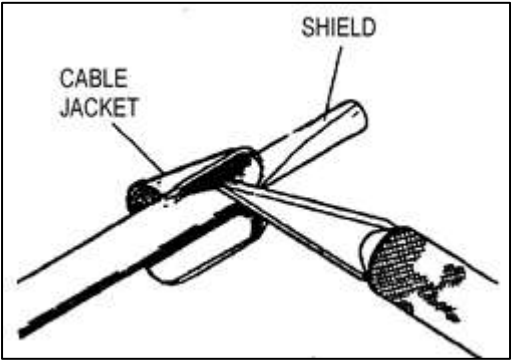
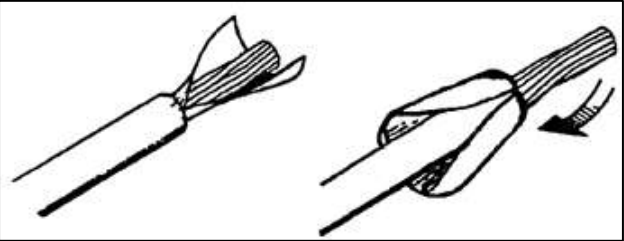
Ethernet Switch End	Wire	PCB End
1	White/Orange	1
2	Orange	2
3	White/Green	3
4	Blue	4
5	White/Blue	5
6	Green	6
7	White/Brown	7
8	Brown	8
Body	Drain Wire*	NC

(\* Crimp drain wire to metal body on Ethernet switch end of cable.)

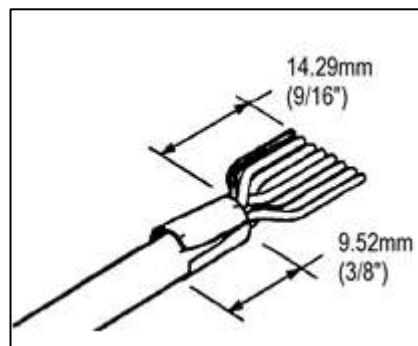
Pair order and polarity of each pair's connection are critical. Both ends of a cable must be wired in the same pattern. See [Crimping and Cabling](#) for details on how to make a Cat 5 STP cable.

## 4.4 Crimping and Cablemaking

### Category 5 STP Cable

1	Slit the cable jacket 15.88mm (5/8") from the end.	 <p>A diagram showing a utility knife cutting a slit into the jacket of a round cable. The cable is labeled 'ROUND CABLE' and the knife is labeled 'UTILITY KNIFE'.</p>
2	Pull the cable jacket away from the shield and fold it back over the cable.  Cut off slit portion of cable jacket 15.88mm (5/8") from the end of the conductors.  Be careful not to cut the shield.	 <p>A diagram showing the cable jacket being pulled back and folded over the shield. The jacket is labeled 'CABLE JACKET' and the shield is labeled 'SHIELD'.</p>
3	Find the overlap seam in the shield.  Carefully pull the shield away from the conductors without damaging the shield.	 <p>A diagram showing the shield being pulled away from the conductors. The shield is shown being peeled back from the conductors.</p>
4	<b>On the Ethernet switch end only</b> , fold the shield back over the cable and trim the shield to 9.52mm (3/8").	
5	<b>On the PCB end only</b> , trim off and discard the foil shield and the drain wire.	

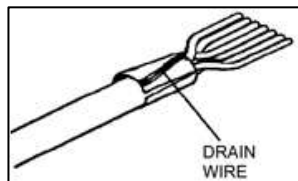
- 6** Untwist the conductors and arrange them to match the wiring table shown below. Trim conductors evenly to 14.29mm (9/16"). Maintain tight twists at the termination points to avoid excessive near-end crosstalk (NEXT), which impairs data communications and results in a high number of errors.



ETHERNET SWITCH END	WIRE	PCB END
1	White/Orange	1
2	Orange	2
3	White/Green	3
4	Blu	4
5	White/Blue	5
6	Green	6
7	White/Brown	7
8	Brown	8
Body	Drain Wire*	NC

\* Crimp drain wire to metal body on Ethernet switch end of cable.

- 7** On the Ethernet switch end only.



The drain wire terminates to the plug shield on the Ethernet switch end only.

Bend the drain wire back tightly across the center of the cable shield on the side of the cable that will face the locking latch of the connector. Cut the drain wire to the same length as the cable shield.

See the instructions with the RJ-45 crimp tool (P/N 039G200061) and terminate the drain wire in the plug. This grounded end of the cable connects to the Ethernet switch

### Assembled Category 5 STP Cable

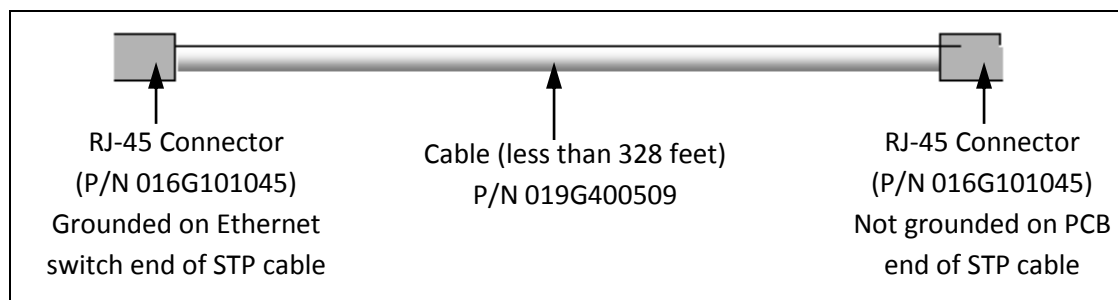


Figure 3.2: Cat 5 STP Cable with Connectors

## 5 Mercury Serviceable Parts

### 5.1 Grinding a Segmented Fountain Blade to Restore It

Advanced Vision Technology (AVT) recommends that segmented fountain blades be returned to the factory for restoration.

AVT has no control over the grinding process used to restore blades by the customer or the customer's grinding service. As such, any blades reground by others cannot be covered under warranty. If the customer chooses to reground the blades, the instructions in this section must be followed.

**WARNING: Do not overheat the blade. Temperatures above 170° F (76° C) will cause the blade to fail in service. When it fails, it will delaminate.**

To keep from overheating the blade during grinding, use these guidelines:

- Use generous amounts of coolant.
- Take very light cuts, 0.0005 to 0.001 inch (0.01 to 0.02 mm).
- Use low feed rates and wheel speeds and a soft grinding wheel.

#### **When Blade Should Be Reground**

Recalibration can compensate for most fountain blade wear. Eventually the blade may wear so much that it needs to be reground to restore the metering edge. This extreme wear is easily visible as a worn away edge, usually at the ends of the blade.

A worn segmented fountain blade can be restored by grinding the metering edge to remove the worn area.

## Grinding Specifications

A segmented fountain blade includes a top portion with a metering edge, and a segmented portion. An acrylic adhesive bonds the portions together.

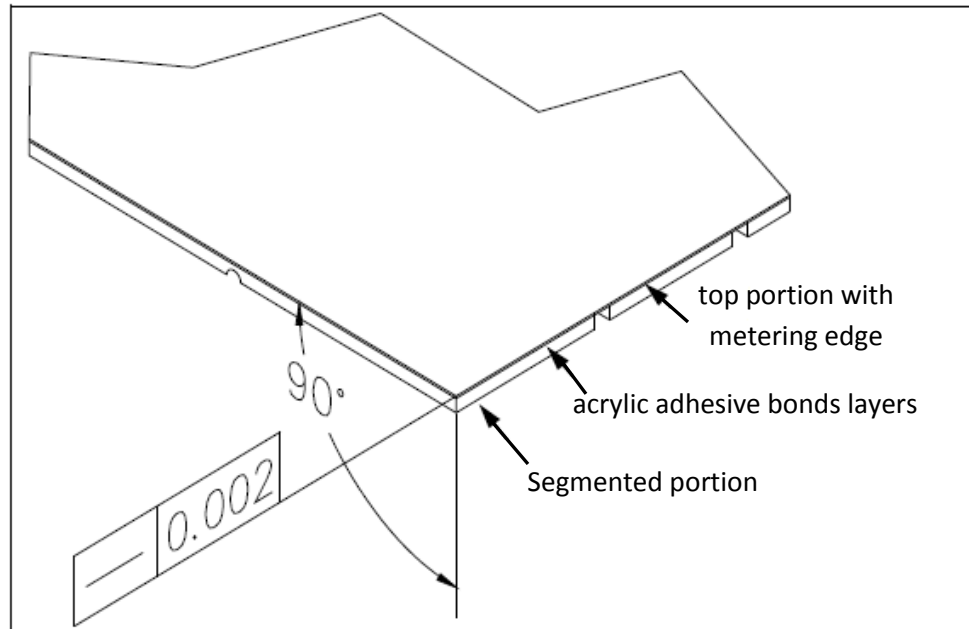


Figure 4.1: Segmented Fountain Blade


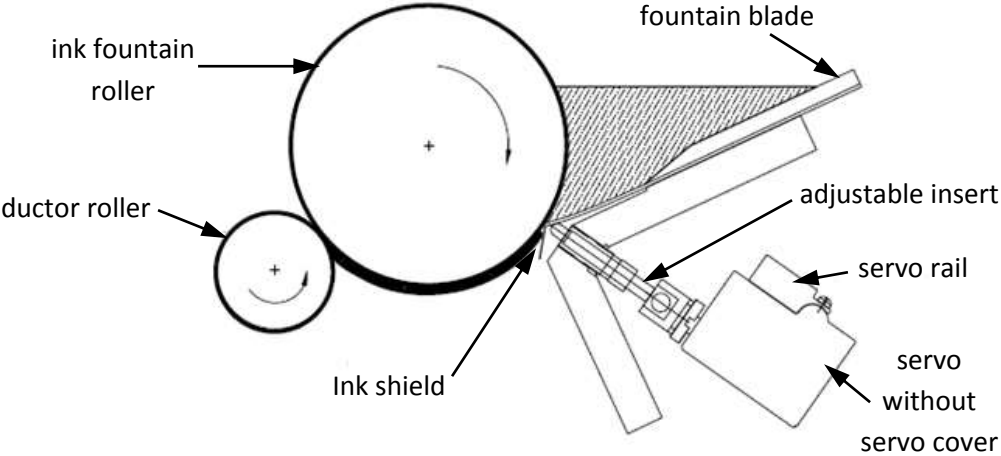
Grind the blade edge square (with no bevel) removing enough material so that the metering edge is sharp. Be careful not to remove the sharp working edge when removing burrs left after grinding. The ground edge of the blade should be straight to within 0.002 inches (0.05 mm).

Contact AVT Customer Service if you have further questions about this procedure.

## 5.2 Replacing Fountain Blade

Follow the steps below to replace a blade without damaging the servos.

### 5.2.1 Remove the Fountain Blade

1	 Use the <b>(zero)</b> button on the Mercury Status View to zero the fountains where the blades will be cleaned or replaced.
2	<p>Open the servo cover.</p>  <p>Figure 4.2: Ink Fountain Blade, Adjustable Insert and Servo</p>
3	Back out the keys until they do not contact the blade,
4	Loosen the blade, hold-down hardware, and remove the old blade.

### 5.2.2 Install the Replacement Fountain Blade

1	Inspect the ink shield and replace it, if necessary.
2	Install the ink shield on the back of the new blade with the two-sided tape provided with the blade.
3	<p>Apply a large amount of approved, high-temperature grease to ink shield area.</p> <p><b>WARNING: Use only approved grease. Failure to use approved grease can result in contamination of the servos, which can cause them to stop working.</b></p> <p>See <a href="#">Using Approved Grease</a> for more information.</p>
4	Insert the new blade and check to see that the keys are not touching it.

5	Gap the blade from the ink fountain roller using blade adjustment screws.	
	Initial Blade Gap Between Blade and Roller	
	0.020 inch (0.5mm)	ductor presses
	0.030 inch (0.8mm)	metering roll presses
6	Tighten the blade, hold-down hardware, and recheck the gap.	
7	Push <b>ent</b> to end the blade retract and restore the servo settings.	
8	Calibrate the fountain.	
9	Reinstall the servo cover. <b>WARNING: The servo warranty will be void if the press is run without the servo covers in place.</b>	

### 5.3 Calibrating Fountains with Adjustable Inserts

The Mercury system must be calibrated so that the ink film on the ink fountain roller is even when the console ink zone settings are even. Calibration also ensures that an even zone setting gives nearly the same ink film thickness on all press fountains, and that the ink film can be set thin enough to run light coverage work.

Most ink fountains use adjustable inserts as shown below.

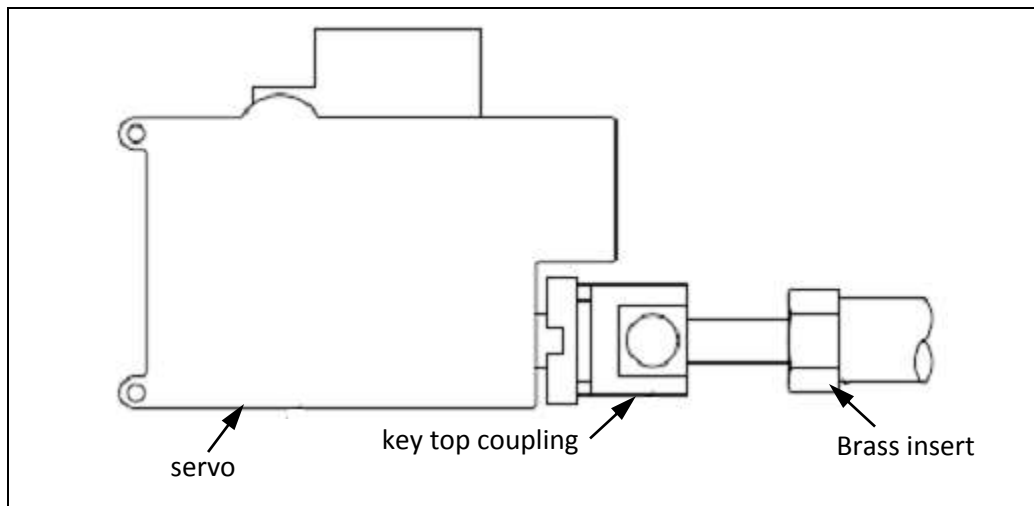





Figure 4.3: Adjustable Insert



Use the following steps to calibrate fountains with adjustable inserts.

<b>What You Need</b>	
➤	Ink film thickness gauge
➤	Open end wrench to match insert hex size

<b>1</b>	<p>Zero the fountain.</p> <p>Push  (<b>zero</b>) button followed by <b>Zero Current Inker</b> to zero the fountain.</p>
<b>2</b>	<p>Run the fountain to 10%.</p> <p>From the console, after the zero is complete, select fountain to be calibrated.</p> <p>Set the ink zones to 10, with the  (all zones) button and then push <b>run</b> to set the fountain. Use a medium 50% sweep setting and run the press at a makeready speed.</p>
<b>3</b>	<p>Measure the ink film.</p> <p>Inspect the ink film on the fountain roller. Use the film thickness gauge to measure the ink film with zones at 10%. For most presses there should be about 1/2 mil (0.0005") on the ink fountain roller, with the press running at makeready speed with a medium sweep setting.</p>
<b>4</b>	<p>Open the servo cover. Adjust the inserts (do not loosen key tops).</p> <p>Open or remove the servo cover. Look for light and/or heavy areas on the ink fountain roller. Turn the adjustable inserts manually, as needed, to get an even ink film on the ink fountain roller. Hold the key top counterclockwise, while turning the insert to take up any backlash.</p>
<b>5</b>	<p>Zero the fountain and measure the ink film again.</p> <p>Use the  (zero) button to zero the fountain. Make sure that the zero film is light enough, but not overtightened in any areas.</p>
<b>6</b>	<p>Increase the zones again and fine-tune.</p> <p>Run the zones out to 10%, then to 20% or higher, and readjust the inserts as needed. Always increase zones to eliminate backlash. For example, if adjustments are made at 10%, run to 20% and then back to 10% to recheck.</p> <p>When the ink is fairly even (there will always be some variation from key to key), turn on the ductor to make the final adjustments.</p>

- |          |   |
|----------|---|
| <b>7</b> | If there is ink starvation, check the bushings. If turning on the ductor results in ink starvation, check for worn bushings. Worn bushings should be replaced to ensure normal contact between the ductor roller and the ink fountain roller (without play between the fountain roller journal and the bushing). Check this by placing a dial indicator on the ball roller and prying against the journals. There should be no more than 0.0005 movement. |
|----------|---|

**NOTE:** Some presses do not have adjustable inserts. Some have adjustable set screws, or the key top must be loosened and the key turned manually with long nose pliers. Always slide the key top against the key thread and hold it counterclockwise while tightening the key top nut.

## 5.4 Replacing Motor Sweeps with Pulleys

If a motor sweep fails, the replacement must be installed carefully to make sure that the new sweep moves to the correct position based on the console settings.

What You Need
➤ Standard set of Allen wrenches
➤ Rubber bands

### 5.4.1 Part 1: Remove Parts and Adjust Pulleys

- |          |  |
|----------|--|
| <b>1</b> | If possible, zero the sweeps from the console as described in the <i>Mercury Training &amp; User's Guide</i> . Remove the sweep box cover to gain access to the sweep motor assembly with pulleys. |
|----------|--|

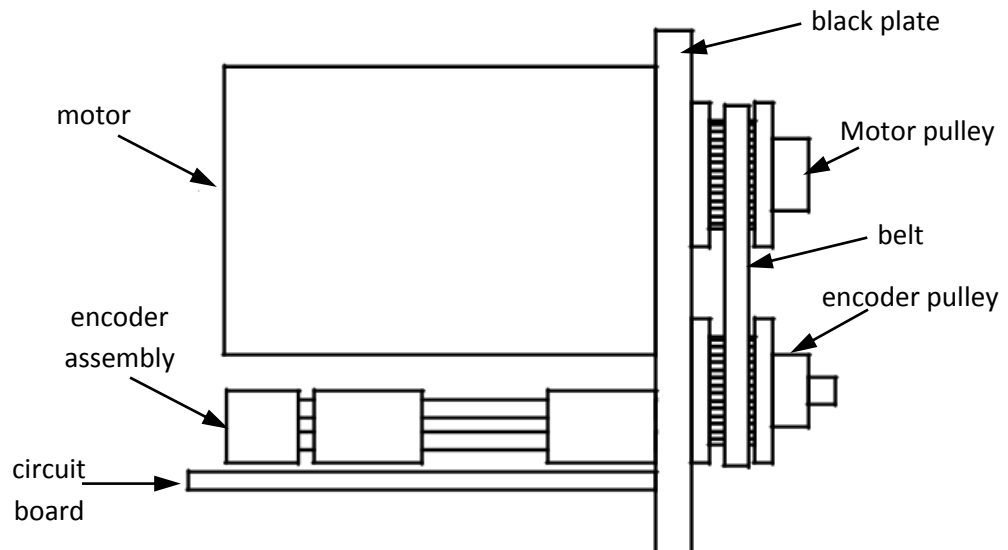
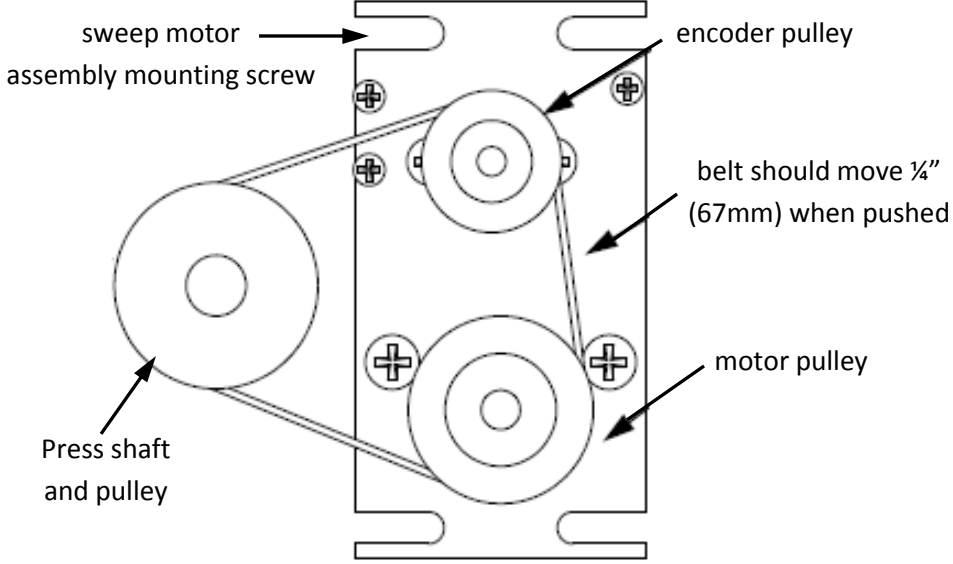


Figure 4.4: Sweep Motor Assembly with Pulleys

<b>2</b>	<p>Loosen the screws attaching the back plate to the sweep housing.</p> <p>Relieve the tension on the drive belts and remove them. Unplug the motor assembly connector from the sweep cable.</p> <p><b>NOTE:</b> The sweep may have a hi-flex ribbon cable that attaches it to a small transition box. If this is the case, remove the transition box cover and unplug the ribbon cable.</p>
<b>3</b>	<p>Remove the screws loosened in step 2 and then move the sweep motor assembly from its housing.</p>
<b>4</b>	<p>Locate the pulley that drives the press sweep shaft. Turn it by hand to the press's mechanical zero position. When the shaft hits its stop, reverse the shaft about 1/4 turn so it is not up against the stop.</p> <p><b>NOTE:</b> You can use the press's original scale to find the zero position or compare the position to a sweep from a different unit that is at the zero position. Some presses may need to idle in order for you to be able to turn the sweep shaft.</p>

#### 5.4.2 Part 2: Replace Parts and Verify Sweep Response

<b>1</b>	<p>Plug the replacement sweep motor assembly into its cable or transition box.</p> <p><b>WARNING: Make sure that the circuit board cannot short out against anything.</b></p>
<b>2</b>	<p>Put a rubber band between the motor pulley and the encoder pulley (regardless of how many pulleys there are).</p> <p><b>WARNING: Do not use rubber bands on Muller Martini presses. Use customer-supplied gears between encoder pulley and motor pulley. Confirm motor wires and limit switch wires are the same.</b></p>
<b>3</b>	<p>From the console, zero the sweeps (see the <i>Mercury Training &amp; User's Guide</i>). Mark the encoder pulley and back plate to indicate the encoder's zero position.</p>
<b>4</b>	<p>Install the replacement sweep into its housing, leaving mounting screws loose.</p>
<b>5</b>	<p>Remove the rubber band carefully, taking care not to disturb the position of the encoder pulley.</p>

<p><b>6</b></p>	<p>Install the belts, being careful not to move the encoder pulley. Tighten the sweep motor assembly mounting screws. Maintain proper tension on the drive belts; they should depress about 1/4" (6mm) when pushing on side of the belt. Install the belts, being careful not to move the encoder pulley. Tighten the sweep motor assembly mounting screws. Maintain proper tension on the drive belts; they should depress about 1/4" (6mm) when pushing on side of the belt.</p>  <p>The diagram shows a top-down view of a sweep motor assembly. A belt is looped around three pulleys: a large 'Press shaft and pulley' on the left, a smaller 'encoder pulley' at the top right, and a 'motor pulley' at the bottom right. The assembly is mounted on a rectangular plate with four screws. Labels with arrows point to the 'sweep motor assembly mounting screw' at the top left, the 'encoder pulley' at the top right, the 'Press shaft and pulley' on the left, and the 'motor pulley' at the bottom right. A note indicates that the belt should move 1/4" (67mm) when pushed.</p> <p style="text-align: center;">Figure 4.5: Sweep Drive Belt Tensioning</p>
<p><b>7</b></p>	<p>From the Mercury console, run the sweep from 0 to 99 and back to zero. Verify that the sweep does not bind or hit the press's mechanical stops.</p> <p><b>NOTE:</b> If the sweep binds against a stop, slip off the belt. Then back out the press shaft pulley away from the stop so that it turns freely. Reinstall the belt. It may be necessary to re-zero the sweep motor using the rubber band, as in steps 2 and 3 above.</p>
<p><b>8</b></p>	<p>Reinstall the cover on the sweep box, being careful not to short it against the circuit board.</p>
<p><b>9</b></p>	<p>Run the sweep again to verify proper operation.</p>

## 5.5 Using Approved Grease

To assure long servo life, it is vital that an approved grease is used when the fountain blade is installed or replaced.

A highly stable grease formulated to resist separation into oil and soap must be used. These greases are referred to as “high temperature” greases and they offer the best long-term stability.

### Packing the Blade

When the fountain blade is first installed, the ink shield area at the back of the blade is packed with a high-temperature grease (P/N 037G900003).

The grease keeps inks and solvents away from the keys where they touch the back of the fountain blade. This keeps the keys from sticking due to encrusted ink.

The grease must be replaced or repacked each time the blade is removed.

### High-Temperature Grease

Greases formulated with stabilizers are called high-temperature greases. The same formulation that makes them stable in high temperatures also keeps them stable over time. This long-term stability is the desirable feature. A less stable grease can break down into oil and soap.

The servo motors are permanently lubricated at the factory. Additional oil may cause the motors to stop working due to contamination. The servo will not run after this happens.

### Specific Approved Grease

The approved red lithium complex, high-temperature grease can be obtained from Power Chem Industrial Supplies in Coram, NY or through distributors.

## 5.6 Adjusting and Cleaning Monitor

### Adjustments to Monitor

The monitor that comes with the Mercury system has controls that let you adjust the contrast and brightness. A small manual comes with the monitor that explains how to use these controls.

Some monitors have a row of controls on the front panel below the monitor screen. The buttons on the far right control the function adjustments. They control the horizontal and vertical position and size.

Normally they should be left alone, so that the monitor uses its default settings. If these settings are changed they will remain changed even if the monitor is repowered.

To return the monitor to its default factory settings, push the small semicircular RESET button in the center.

### Clean the Touchscreen

The surface of the monitor should be cleaned periodically to remove oils and dust. Any non-abrasive glass cleaner may be used. Apply with a soft cloth.

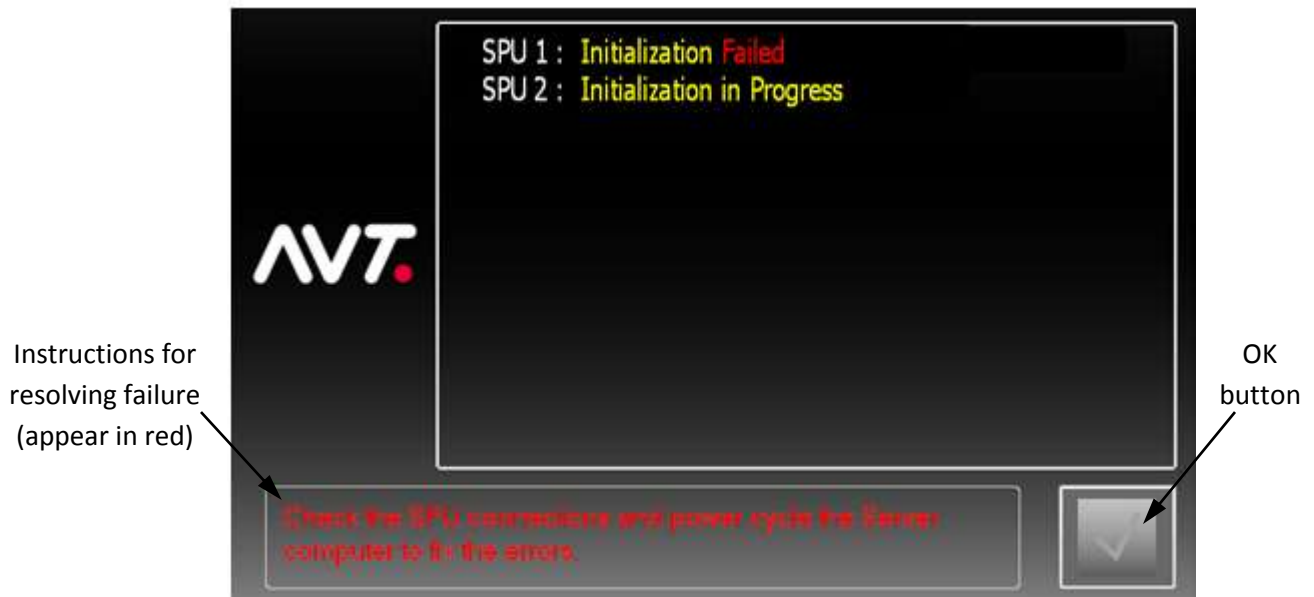
Do not use the touchscreen until it is completely dry.

**NOTE:** Turn off the monitor before cleaning it.

## 6 Mercury Troubleshooting

### 6.1 Troubleshooting System Startup

During system initialization, one or more of the SPUs may fail initialization.



1	Touch the <b>OK</b> button to acknowledge the state of the SPU connections and then follow the instructions on the screen to resolve the failure.
2	Push the <b>red power</b> button on the front of the computer to turn the system off. Then immediately push the <b>red power</b> button again to restart the system. (There is no need to wait.)

If you need to restart the system three times in a row, you will need to use the following steps to restore the Mercury defaults.

1	Shut down the <b>Mercury Client</b> application.
2	Click the <b>Start</b> button and then click on the <b>AVT Field Service</b> folder.
3	Click on <b>Restore Mercury Defaults.bat</b> .
4	On the Restore Mercury Defaults screen, type <b>go</b> . (You will need a keyboard to do this.)



This resets some of the damaged files and then restarts the Mercury server and client.

**NOTE:** This feature is only available for Mercury Client 1.40 and later, and for OCU3 firmware 1.40 and later.

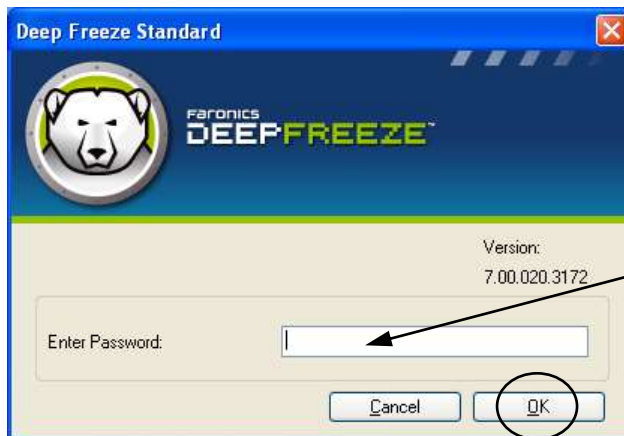
## 6.2 Changing System Configuration in the Field

There is a Deep Freeze feature that protects the operating system and applications on the hard drive.

**NOTE:** Only authorized AVT service personnel are allowed password access to the Deep Freeze dialog.

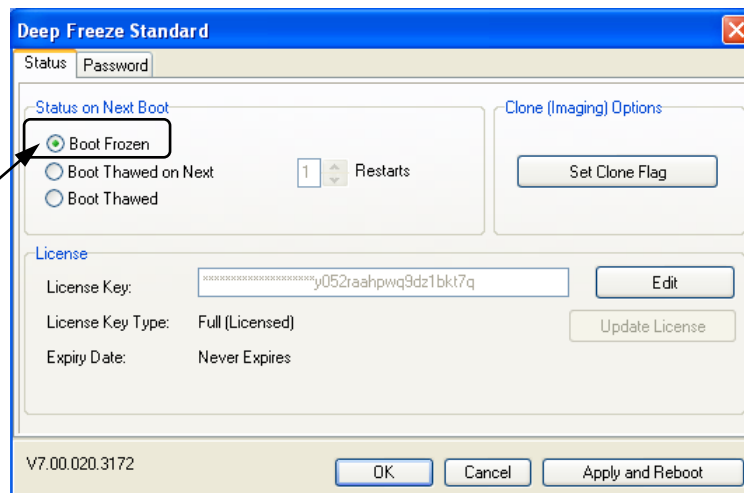
- You will need a keyboard for this procedure.
- The polar bear icon  indicates that the hard drive is “frozen” or protected. In this mode, any changes to the hard drive will be immediately reversed when the computer is reset. This is the default.
- The polar bear icon with an X  indicates that the hard drive is “thawed” or unprotected.

- 1 Touch **Ctrl-Shift-Alt-F6** and the Deep Freeze Standard initial popup displays.



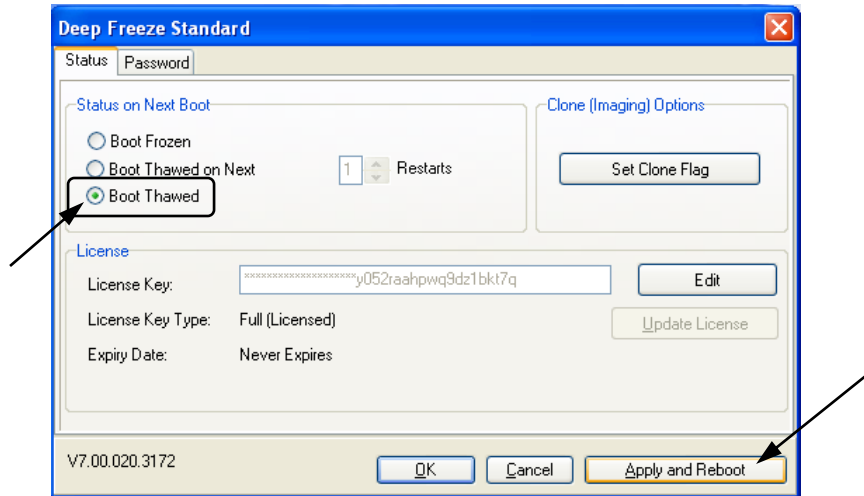
- 2 Enter the password and then click **OK**.

The Deep Freeze Standard dialog displays with the **Boot Frozen** radio button selected by default.





- 3 To make changes to the Mercury system, select the **Boot Thawed** radio button, select **Apply and Reboot**, and then confirm **Yes** to reboot computer.

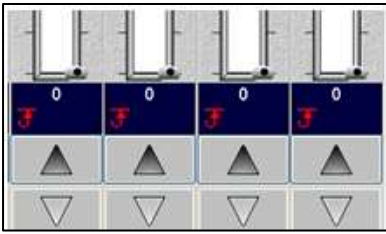
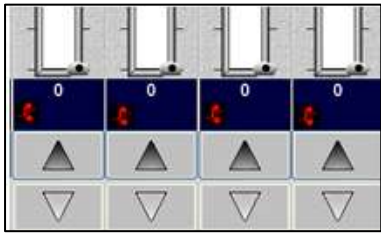
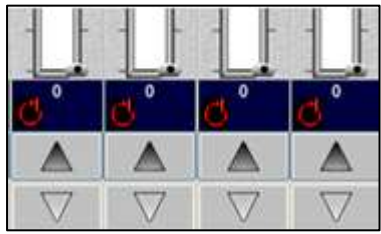


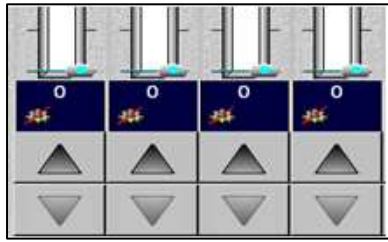
The system will reboot with the hard drive no longer protected, allowing you to make changes to the Mercury system.

- 4 After you make any needed changes to the system, enter **Ctrl-Shift-Alt-F6**, the password **Frigidaire**, and then click on **OK**. Select the **Boot Frozen** radio button and then **Apply and Reboot**.

### 6.3 Troubleshooting Error Messages and Error Icons

<p>SPU-XX timeout popup displayed at client</p>	<p>An attempt to communicate with SPU hardware failed. Possible reasons could be a power connection problem, a damaged SPU to Mercury system cable, electrical interferences, etc.</p> <p>Close the Mercury server application and Mercury workstation software, switch off the SPU, re-power the SPU, and then restart the Mercury server application and workstation software.</p> <p>If problem persists, re-power both the Mercury server application machine and SPU hardware.</p>
<p>“Inker: xxxx,xxxxx,xx timeout” displayed</p>	<p>An action to run the inkers in the list mentioned in the popup failed to perform the operation that was issued last. This could be due to a failure in communication or a failure of the fountain to respond properly to the command.</p> <p>Re-issue the command to run the setting.</p>

<p>“Zero Needed: xxxx,xxx...” popup displayed</p>	<p>This displays in instances where the fountain position was not known or was lost by the SPU. If this condition occurs, the fountain should be recalibrated to zero.</p> <p>Press <b>OK</b> in the popup box and this is displayed.</p> <p>OR</p> <p>Manually zero all the fountains from the list, one after another, using <b>Zero Inker &gt; Current Inker</b>.</p> <p>OR</p> <p>Zero press by selecting <b>Zero Inker &gt; Zero All Inkers</b>.</p>
	<p>An <b>initialization</b> icon is being displayed for every zone for some fountains, which indicates that the SPU controlling these fountains failed to communicate with the Mercury software.</p> <p>Make sure that the SPUs are connected properly, the site file is properly configured for the SPU's COMM ports, and that the SPUs are switched ON. Then restart the SPUs and Mercury machines.</p>
	<p>A <b>communication error</b> icon is being displayed for every zone for some fountains, which indicates that during the operation that was performed last, there was a communication error with the fountain(s). Possible reasons could be failed fountain hardware or some interference.</p> <p>To fix this, use the <i>Running Servo Test</i> diagnostic to verify that the fountain is working correctly. If the error persists even during the servo test, call AVT Technical Support to replace the hardware.</p>
	<p>A <b>stall</b> icon for some of the zones is being displayed, which indicates that the corresponding servo motors used to open up the key have failed to move in a forward direction while a run was issued. Various reasons for a stall could be from worn out hardware to clogged ink in servo.</p> <p>Use the <i>Running Servo Test</i> diagnostic to make sure stalled servos are stalling all the time. Contact AVT Technical Support to get stalled servos replaced or you can replace servos manually.</p>



A **configuration error** icon is displayed for all the zones of a fountain to indicate that the move operation failed for all servos, because one or more servos failed to communicate to the SPU.

Use the [Running Servo Test](#) diagnostic to determine which servo(s) failed. Failed servos will require replacement.

## 6.4 Performing Basic System Test

Use the following steps to check the Mercury system.

<b>1</b>	Turn off the system computer.
<b>2</b>	Turn off the SPU(s). The SPU power switch is on the bottom, near the connectors. Wait until the green power light is off.
<b>3</b>	Turn on the SPU first and then the computer.
<b>4</b>	Verify that the green LED on the SPUs back panel is <b>ON</b> . <b>NOTE:</b> Verify that connections from the SPU to the Mercury machine's DIGI board cable connector are intact. Verify that the SPU is correctly configured to that particular port of the DIGI board, as configured in the SITE file (xml).
<b>5</b>	Switch <b>ON</b> the SPU, power <b>ON</b> the Mercury machine, and start the Mercury server application.
<b>6</b>	If the Mercury server application displays the following message: <pre>"Cannot open COMM port COM X)"</pre> on the Server-SPU section, then the COMM port configured for the corresponding SPU is wrong in the SITE file. Change the COMM port by manually editing the <b>SITE</b> file.
<b>7</b>	Verify that the following messages display: <pre>"Com port COM x opened!" "Init spu for spux passed!"</pre> These messages display consecutively for a successful system check.
<b>8</b>	Run the Servo diagnostic test. See <a href="#">Running Servo Test</a> .
<b>9</b>	Run the SPU diagnostic test. See <a href="#">Running SPU Test</a> .

## 6.5 Troubleshooting Servo Failures with Adjustable Inserts

**WARNING:** Servo motors are permanently lubricated at the factory. Do **NOT** oil the servos as this may cause the motors to stop working due to contamination. The servo will not run after this happens.

Do **NOT** clean the servos with solvents. Solvents may contaminate the gear train resulting in permanently reduced torque. Servo communication errors also may occur until the servos and harness are dry.

Do **NOT** turn servo motors by hand. This may damage internal parts.

Running the Servo diagnostic test (see [Running Servo Test](#) and the *Mercury Training & User's Guide*) can help locate a faulty servo or one that is not adjusted correctly. If the servo passes the COMM Test (communication), but fails the position test the console shows an error message. This can occur when the brass inserts are too tight at zero and the servo cannot reach its zero position.

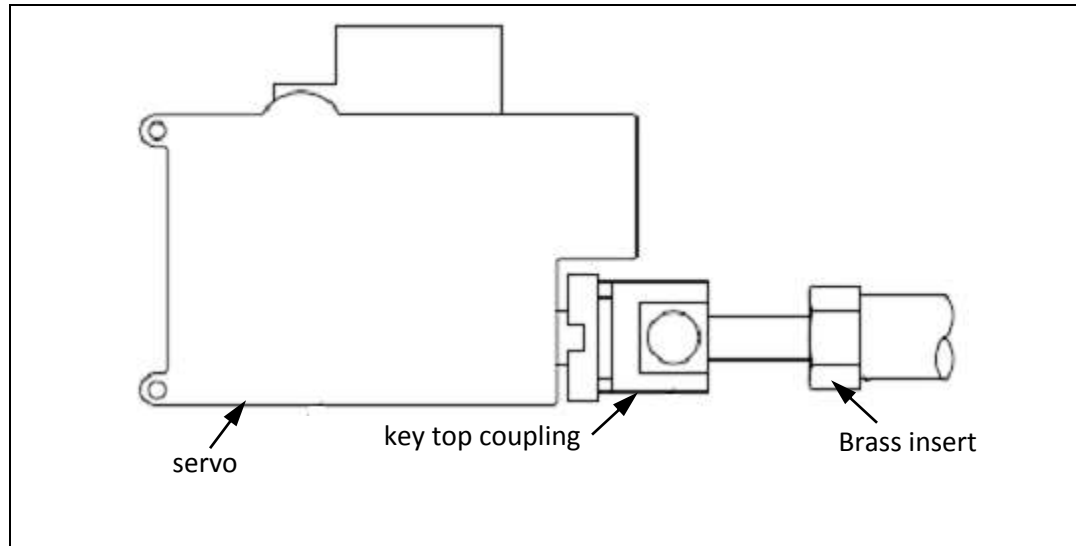
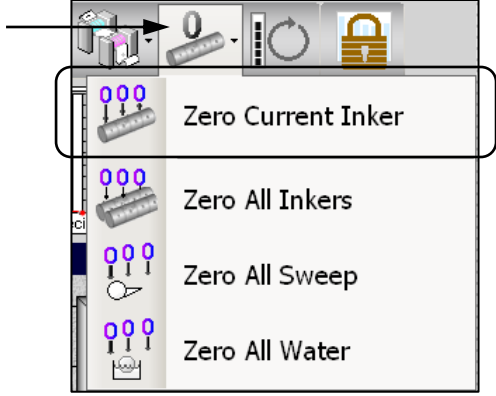



Figure 5.1: Adjustable Insert




1	Note the servo number that was identified during the test. During testing, Servo #1 is always closest to the servo harness connector.
2	Remove the servo cover. Then remove the problem servo via the two bolts holding it on the rail.
3	Make sure the ink key moves freely. If not, remove it and clean the ink key and brass insert, or replace the insert. If the key was binding, this could be the problem and not the servo motor.
4	Connect the new servo, but do not install it on the key top and rail. Let the motor hang by its connector making sure it will not fall off, and that it is connected properly and in the correct direction.

5	<p>Check the connection to make sure the brown wire on the servo harness is the furthest away from the servo coupling for the servo.</p> <p>A short circuit could occur if it is connected improperly.</p>
6	<p>Select the inker you want to adjust. From the Mercury Status View, touch the <b>Zero</b> button and then touch <b>Zero Current Inker</b> from the drop-down menu.</p>  <p>The screenshot shows a control panel with a 'Zero' button highlighted by an arrow. Below it is a drop-down menu with four options, each with a '000' icon and a small diagram: 'Zero Current Inker', 'Zero All Inkers', 'Zero All Sweep', and 'Zero All Water'.</p>
7	<p>Turn the ink key in by hand for minimum ink film thickness ("0"). If the key top is not lined up at "0" (90°), loosen the key top and adjust it.</p>
8	<p>Install the servo. The servo motor and ink key will be at the zero position.</p> <p>Then use <a href="#">Running Servo Test</a> to ensure that there was only one problem servo on that rail. Reinstall the servo cover.</p>

## 6.6 Troubleshooting a Short Circuit

You may notice a short circuit when running the servos, sweeps, or waters for a particular fountain. To track down the short circuit, try to isolate the problem. Inspect all unit cables, to the banks of servos and to the sweeps.

If running the servos causes an SPU COMM error, the communications error icon () will be displayed for all fountain zones.

1	<p>Push <b>Run Inker</b>  for several fountains. To do this, first make some changes for some of the fountain's console values and then push <b>Run Inker</b> for one fountain. Make sure the "move in progress" icon displays for that fountain. Then switch the fountain by selecting another fountain from the thumbs view and push <b>Run Inker</b>.</p> <ul style="list-style-type: none"><li>• If errors occur on several, there is probably a problem with the SPU. It will have to be replaced.</li><li>• If the error only occurs on one fountain, there is probably a short in one servo or the unit cable may have been damaged.</li></ul>
2	<p>Inspect the cable for damage. Then disconnect half the servos on the fountain (or bank) by disconnecting their servo harness connector, and push <b>Run Inker</b> again.</p>
3	<p>Disconnect servos until the configuration error icon  displays on the zones. This will take awhile, because the system will try each move a number of times before finally displaying an error message.</p>
4	<p>Reconnect servos until the SPU COMM error  is displayed and then replace that servo.</p>

**NOTE:** There is an Auto Retry feature available when running the Servo test diagnostic that can help you find the bad servo. See [Auto Retry the Servo Test](#) for details.

## 6.7 Troubleshooting Short Circuits in Sweep Motors

What You Need
<ul style="list-style-type: none"> <li>➤ Spare servo</li> <li>➤ Sweep Test Harness (P/N 050G200161-01)</li> <li>➤ Optional Ribbon Cable Interface (P/N 050G200013-05)</li> </ul>

If the Sweep test fails, but cannot locate the problem, there may be a short circuit in the sweep motor or sweep servo. This harness can help you isolate the problem motor. (You can use this cable to locate a problem sweep servo, but it is easier to just replace the servo.)

**NOTE:** If one or more sweeps respond, then a sweep cable may be bad. See [Sweep Cable Problem](#).

### Using Sweep Test Harness

**WARNING:** Servo damage may occur if you connect this harness to any unit cables that control the ink fountains. This harness must be used only with sweep cables.

1	<p>Get a servo from the Spares Kit or temporarily remove one from an ink fountain. Then connect the servo to the test harness. Locate the first sweep motor or sweep servo (usually the sweep for the first fountain).</p> <div style="text-align: center;"> <p>The diagram illustrates the connection of the sweep test harness. On the left, a box labeled 'SPU' is connected to a 'Sweep Junction Box' by a 'cable (P/N 050G200128)'. From the 'Sweep Junction Box', three 'sweep cables' extend to the right. These connect to an 'Optional ribbon cable adapter (P/N 050G200128)'. This adapter is connected to a 'Sweep test harness (P/N 050G200128)', which is finally connected to a 'servo' box on the far right.</p> </div> <p style="text-align: center;">Figure 5.2: Sweep Test Harness</p>
2	<p>Disconnect the motor or servo from the sweep cable. In most cases you will need to remove the cover of the sweep to do this.</p>
3	<p>Connect the sweep test harness to the sweep cable.</p> <p><b>NOTE:</b> If the system normally requires the press to be running in order to move sweeps, then run the press.</p>

<b>4</b>	Use the Mercury console to try to move the sweeps. Compare the results to the table below.	
	<b>Sweep Test Harness Results</b>	<b>Action</b>
	The servo on the sweep test harness and all sweeps move.	<p>You have located the problem. Replace the motor or servo, and reconnect it to its sweep cable. If no spare motor is available, contact AVT Customer Service to obtain one.</p> <p>In the meantime, leave the servo test harness in place so that the other sweeps can be controlled from the console. You can manually turn the pulleys for the bad sweep motor until the replacement arrives.</p>
	No sweeps move.	<p>Reconnect the motor or servo to its sweep cable. Then connect the sweep test harness to the next sweep cable and repeat steps 2-4 above until you locate the problem sweep.</p> <p>If you try the sweep test harness for each sweep and none will move, replace the sweep cable for the first fountain. See <a href="#">Sweep Cable Problem</a> below.</p>
One or more sweeps move	<p>You have located a bad sweep motor or servo, but there may also be a bad sweep cable. Replace the motor or servo and reconnect it to its sweep cable. Then see <a href="#">Sweep Cable Problem</a> below.</p> <p>Try again, so that the SPU can update internally for servo usage in place of the sweep motor.</p>	

### Sweep Cable Problem

If a sweep cable is bad, it may have an open circuit. If this is the case, during the Sweep test that sweep and the sweeps for the subsequent fountains will not move.

For example, a bad sweep cable for Unit 3 on a 6-unit press would result in sweep failure on units 3-6. The Unit 1 and Unit 2 sweeps would still work.



## Isolate Bad Sweep Cable

To isolate a bad sweep cable, follow the steps below.

<p><b>1</b></p>	<p>Go to the sweep junction box and label all the sweep cables coming from the box, so that you will be able to match them up.</p>
<p><b>2</b></p>	<p>Identify which sweeps do not move and swap the cable from the first problem sweep with the next sweep cable. For example, if units 3-6 fail, swap the Unit 3 sweep cable with the Unit 4 sweep cable.</p> <div data-bbox="453 552 1328 957" data-label="Diagram"> <pre> graph TD     SJ[ Sweep Junction Box ] --- PS[ Prior Sweep ]     SJ --- FPS[ First Problem Sweep ]     SJ --- NPS[ Next Problem Sweep ]     </pre> <p style="text-align: center;">Figure 5.3: Swapping Cable for Units after the Failure</p> </div>
<p><b>3</b></p>	<p>Use the Sweep Test to try to move the sweeps. If the problem follows the cable, then replace the cable.</p>
<p><b>4</b></p>	<p>If there is no change, locate the sweep cable for the fountain PRIOR to the first problem fountain. Then swap it with a subsequent sweep cable.</p> <div data-bbox="453 1228 1328 1602" data-label="Diagram"> <pre> graph TD     SJ[ Sweep Junction Box ] --- PS[ Prior Sweep ]     SJ --- FPS[ First Problem Sweep ]     SJ --- NPS[ Next Problem Sweep ]     </pre> <p style="text-align: center;">Figure 5.4: Swapping Cables for Units before the Failure</p> <p>If the problem follows the cable, then replace the cable. If the problem continues, contact AVT Customer Service for further assistance.</p> </div>

## 6.8 Resolving Inking Problems

Inking Problem	Solution
The ink on fountain roller is uneven.	When printing a uniform solid, zone settings should be even (plus or minus five), if rollers are in good condition and properly set and dampening is even. Recalibration due to blade wear may be needed. See <a href="#">Calibrating Fountains with Adjustable Inserts</a> .
The fountain setting suddenly becomes uneven.	An error message was probably overlooked. Save the current form and then zero the press. Recall the form and push <b>set press</b> . If any error messages occur during this procedure, see <a href="#">Troubleshooting Error Messages and Error Icons</a> .
There is a problem with only one zone.	A servo may be bad. Run the fountain up and down, and watch the servo in that zone to see if it moves. If not, replace the servo and/or clean the ink key. See the <i>Mercury Training &amp; User's Guide</i> for instructions on testing the servos.
The problem is on one side of the fountain.	Make sure the blade is not stuck and fountain stops are evenly tightened. There also may be a bad press bearing.
The ink changes as the fountain roller rotates.	The roller is out of round. The ink fountain roller should be within 0.0005" TIR (total indicated run out). This can be measured with a dial indicator as the ink fountain roller rotates.  To fix this, the roller must be replaced or ground concentric to the journals.
There is too much ink at zero.	Make sure fountain stops are evenly tightened. If they are, recalibration may be needed. See <a href="#">Calibrating Fountains with Adjustable Inserts</a> .
Can't get enough ink for heavy forms.	Make sure that the blade is not stuck and sweep (fountain roller speed) is at maximum. Check for proper roller contact throughout the ink train. The ink strength and type of paper may require a larger key opening. Call AVT Customer Service for a new system disk to provide a wider opening.

Inking Problem	Solution
Poor response for light forms the ink film is almost the same from 0 to 20.	Make sure the sweep is not set too low. If the sweep is OK, the zero may be set too tight for the fountain making recalibration necessary.  See <a href="#">Calibrating Fountains with Adjustable Inserts</a> .
The ink film changes or becomes uneven when the ductor is turned on.	The ink fountain roller bushings may be very worn. This can be checked with a dial indicator at the end of the roller while prying on the journal.

**NOTE:** The 24-hour Customer Service Hotline is listed on the inside front cover of this manual.

## 6.9 Resolving Sluggish System Response

Reason for Sluggish Response	Solution
There is an intermittent communication or positioning problem with one or more servos, sweeps, or waters.	<p>Try to isolate the slow fountain. Change the zone settings and push <b>run</b> a few times.</p> <p>If error message appears, see <a href="#">Troubleshooting Error Messages and Error Icons</a>.</p> <p>If the problem continues, turn on the diagnostic messages (<a href="#">Viewing SPU Diagnostic Messages</a>). Watch for servo error messages on the monitor screen.</p> <p>Use the Utility Disk to run the Autotest software. This will provide a complete test of all servos on the system or the single fountain that is causing trouble. A configuration error will usually show on all servos past the one that caused the problem.</p> <p>Replace the problem servo that is closest to the cable connector. If this does not fix the trouble, replace the adjacent servo (closer to the cable connector).</p>

**NOTE:** If the servos of a particular fountain do not respond, an error message will be displayed. For more information, see [Troubleshooting Error Messages and Error Icons](#).



## 7 Mercury Diagnostics

If the Mercury system is not operating properly, diagnostics can help you determine what is wrong and how to fix it.

### 7.1 Accessing System Diagnostics









You access the Mercury system diagnostics by touching the **System** button and then touching **System**.

The Mercury Configuration dialog displays the available diagnostics.



Touch any of the **Diagnostics** buttons on the Mercury Configuration screen.

	<b>Servo</b>	Perform a test of one servo or test all servos.
	<b>SPU</b>	Perform a test of the SPU(s).
	<b>History</b>	View available Auto Test and Servo Test results.
	<b>Auto</b>	Perform an auto test of all inkers, all upper inkers, all lower inkers, or the current inker.
	<b>Sweep</b>	Perform a test of selected sweeps or test all sweeps.
	<b>SPU Configuration Display</b>	View the SPU configuration.


See the *Mercury Advanced User's Manual* for more information on system diagnostics.

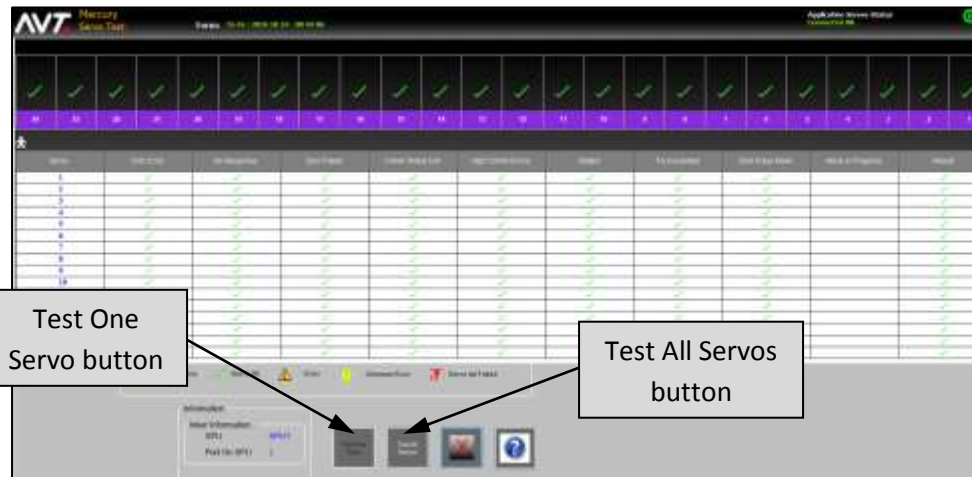
## 7.2 Running Servo Test

You can use the Servo test diagnostic tool to troubleshoot problems with the fountain hardware. On every test performed, the status will be updated for every servo in that fountain. In the list that displays with error icons, those with no errors display with a green checkmark. Those with an error of some kind display with a warning sign.

### 7.2.1 Perform Basic Servo Test

1

Touch the **Servo** button  from **Mercury Configuration > Diagnostics** and the Servo Test screen displays with the status of all the servos displayed in the list, along with an iconic representation of good and bad servos.




**NOTE:** Servo #1 is always closest to plug the servo wiring harness plugs into.

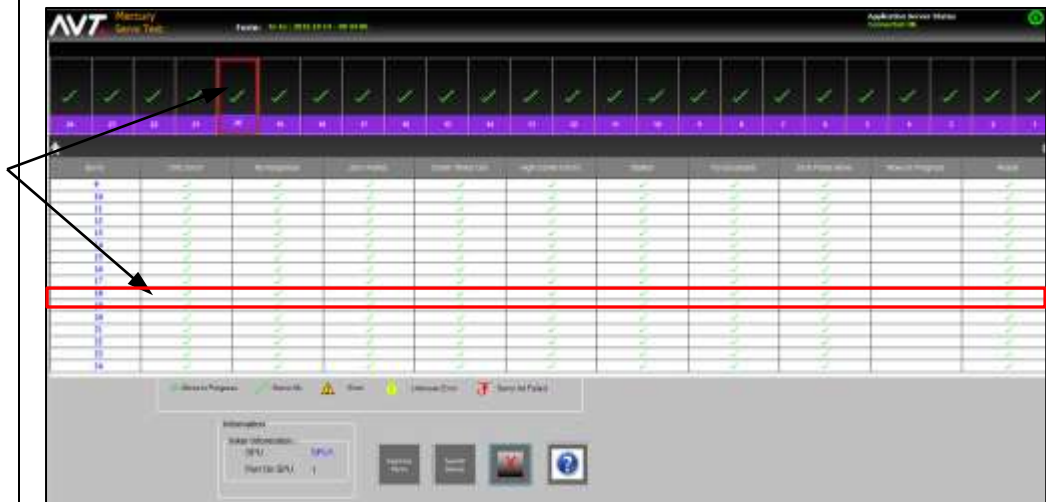
2

To test one servo, touch a servo and then touch the **Test One Servo** button.



In this example, servo 20 is selected. You can see the **zone status icon**  displayed in green for the servo and also on the **Test One Servo** button.

When the test is complete, the results display on the screen.



3 To test all servos, touch the **Test All Servos** button.



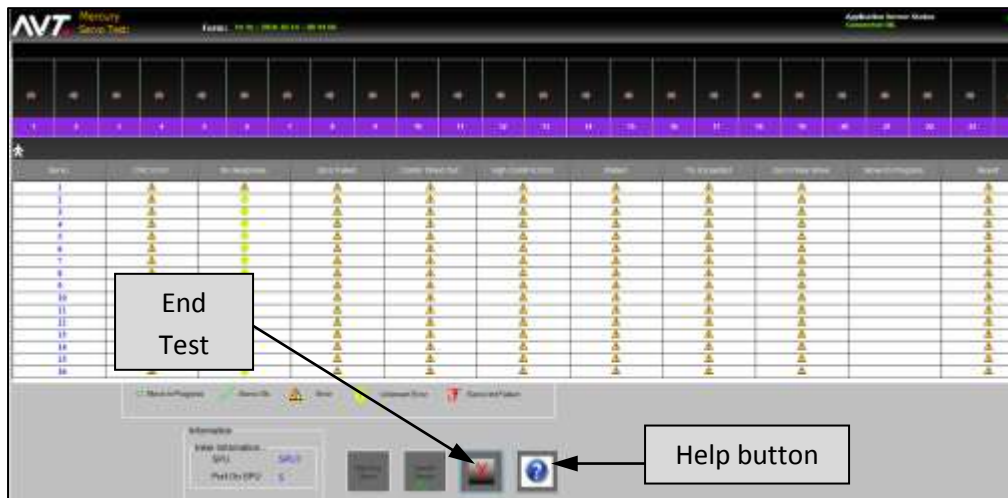
You will see the **zone status icon**  displayed for all the servos and on the **Test All Servos** button.




When the test is complete, the results display on the screen.



4 If the Servo test fails, error icons display on the screen. Click  to end test.



**NOTE:** Touch  (**Help** button) to access the *Mercury Service Manual* and go directly to the section for the Servo test.



## 7.2.2 Auto Retry the Servo Test


If the servos do not pass the **Servo Test > Test All the Servos** for an inker and the individual servo(s) causing the problem cannot be identified, Mercury enters the Auto Retry mode to isolate the bad servo(s).

### Auto Retry Feature

When Test All Servos cannot determine the status of each servo, Auto Retry can help you find the bad servo(s) on a servo rail for the following special cases:

- There is a short circuit in the servo or cable.
- The bad servo is interfering with servo communication.
- The first servo is disconnected.
- No rail is connected to an inker port.


### Auto Retry Process

- 1 When the servo test fails and the following dialog displays, touch the  button to initiate Auto Retry.



As Auto Retry starts, the following status displays on the Servo Test screen.



You will see the  icon display on the **Start Auto Retry** button while the Auto Retry is in progress.

2 For every retry operation, review the status of the Auto Retry operation that displays on the Servo Test screen.

<b>Inker Status</b>	<b>Failed</b> – servo failed test <b>Passed</b> – servo passed test
<b>Auto Retry Count</b>	Number of retries so far during Auto Retry operation.



Figure 6.1: Auto Retry In Progress (Failed with 2 Retries)




Figure 6.2: Auto Retry In Progress (Passed with 15 Retries)

3 When status shows Inker Status: Failed, let Auto Retry continue running and disconnect the servos one by one. Start with the servo farthest away from the servo harness connector.

**Notes:**


- If connectors are removed from all but the first servo and it still does not run, replace it.
- If the display then indicates Inker Status: Passed, the first servo was the problem. If not, either the cable going to the SPU or the SPU itself is faulty.
- An inker failure will always occur if no servos are connected.
- When the connector of the problem servo is removed, the first servo on the fountain will start to run.
- Replace the bad servo and plug in all the connectors that had to be removed.

**4** To stop Auto Retry, press the  button.

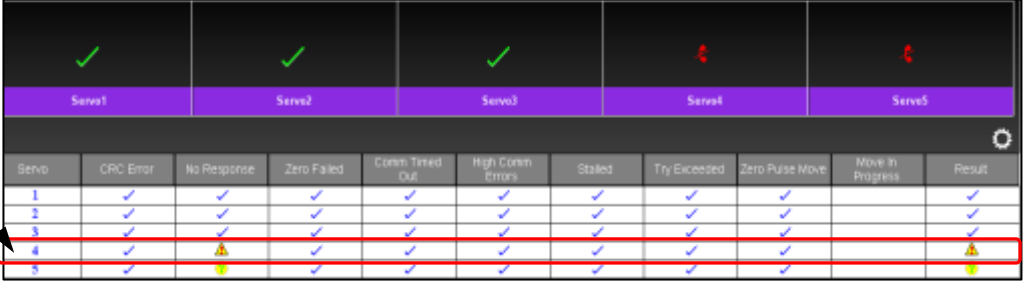
**NOTE:** The Auto Retry operation will continue to run forever until you stop it.

**5** After stopping the Auto Retry operation, the **Test All Servos** button becomes enabled for you to test the inker(s) again.

Touch the **Test All Servos** button to test the inker again.




In the following example, the status after Test All Servos is done shows a servo at position #4 disconnected from a rail. The status for the first three servos is OK, but there is a COMM error starting from servo position #4.




Servo	CRC Error	No Response	Zero Failed	Comm. Timed Out	High Comm Errors	Stalled	Try Exceeded	Zero Pulse Move	Move In Progress	Result
1	✓	✓	✓	✓	✓	✓	✓	✓		✓
2	✓	✓	✓	✓	✓	✓	✓	✓		✓
3	✓	✓	✓	✓	✓	✓	✓	✓		✓
4	✓	✓	✓	⚠	✓	✓	✓	✓		⚠
5	✓	✓	✓	⚠	✓	✓	✓	✓		⚠

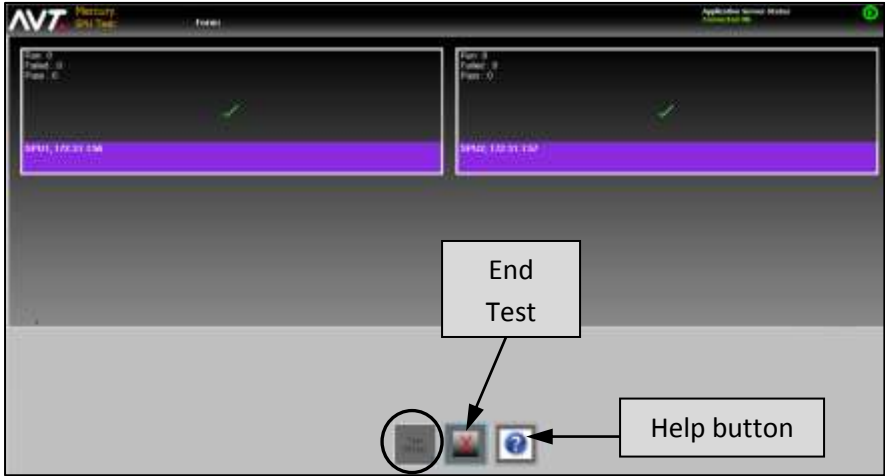
This information can help you diagnose a missing or disconnected servo.

**NOTE:** Touch  (Help button) to access the *Mercury Service Manual* and go directly to the section for the Servo test.


## 7.3 Running SPU Test


You can use the SPU test diagnostic tool to test that the available SPUs are communicating with the server application and able to move the attached equipment. An SPU test does a routine communication check with the SPUs that are configured and displays all the SPUs that are configured for that machine (as in the SITE file).

1 Touch the **SPU** button  from **Mercury Configuration > Diagnostics** and the SPU Test screen displays with the statistics of total tests run, failed, and passed. You can test a single SPU, multiple SPUs, or all SPUs.



2 To test one servo or multiple servos, touch the servos to check and then touch the **Test SPU(s)** button. To test all SPUs, touch the **Test SPU(s)** button. When the test is complete, the results display showing Run, Failed, or Pass.



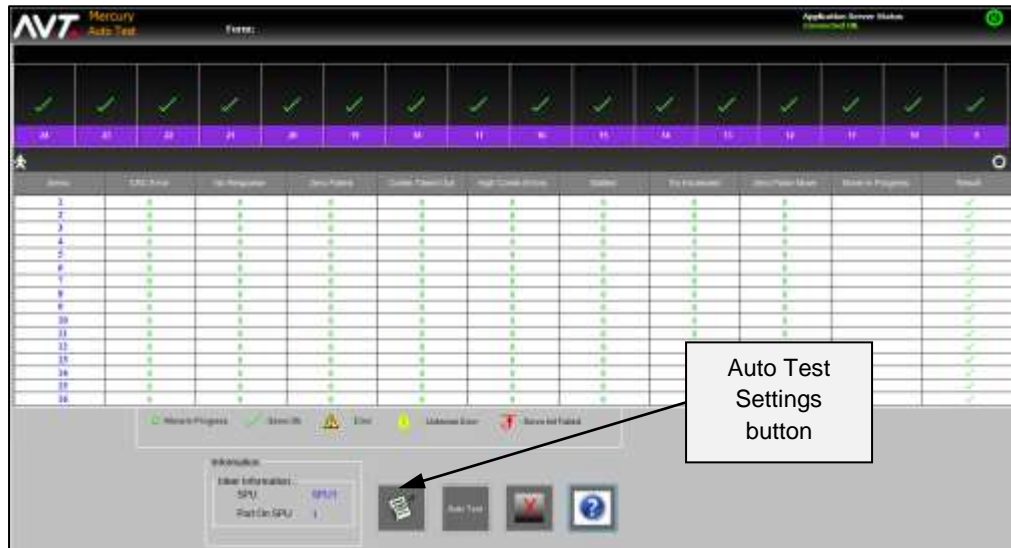
**NOTE:** Touch  (**Help** button) to access the *Mercury Service Manual* and go directly to the section for the SPU test.

## 7.4 Running Auto Test

You can use the Mercury Auto test diagnostic tool to test the fountain key actuators and verify that mechanical movement is reliable.

### 7.4.1 Perform Basic Auto Test

- 1 Touch the **Auto** button  from **Mercury Configuration > Diagnostics** and the Auto Test screen displays.




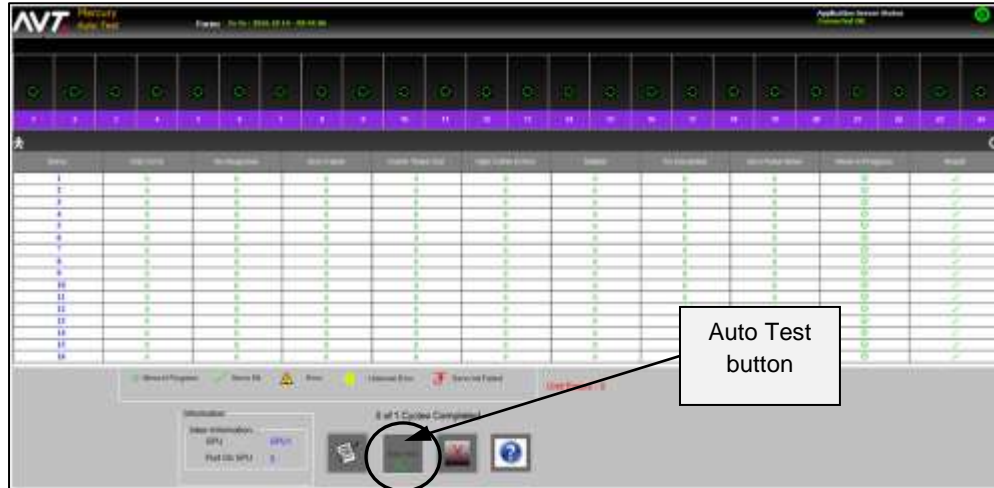
- 2 Touch the **Auto Test Settings** button, specify the settings, and touch .



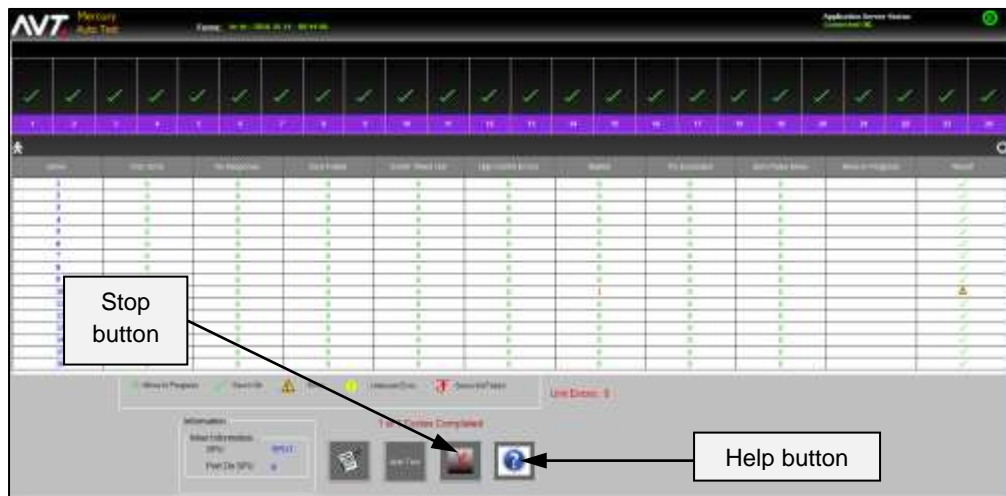
- Click on the **Inkers to be tested** drop-down box and select **All Inkers**, **All Upper Inkers**, **All Lower Inkers**, or **Current Inker**.
- Specify the **Open Keys Up To (Range: 1-399%)** and the **Close Keys Up To (Range: 0-399%)** percentages.
- Specify the **Number of cycles (Range: 1-255)**.
- Click on the **Loop Type** drop-down box and select either **Sequential** or **Simultaneous**.
- Click on the **Time Delay** drop-down box and select **1**, **30**, or **60** seconds.

3 To perform the Auto test, touch the **Auto Test** button.


In this example you can see the green zone status icons (  ) for all servos and also on the Auto Test button.



When the test completes, the results display on the screen.

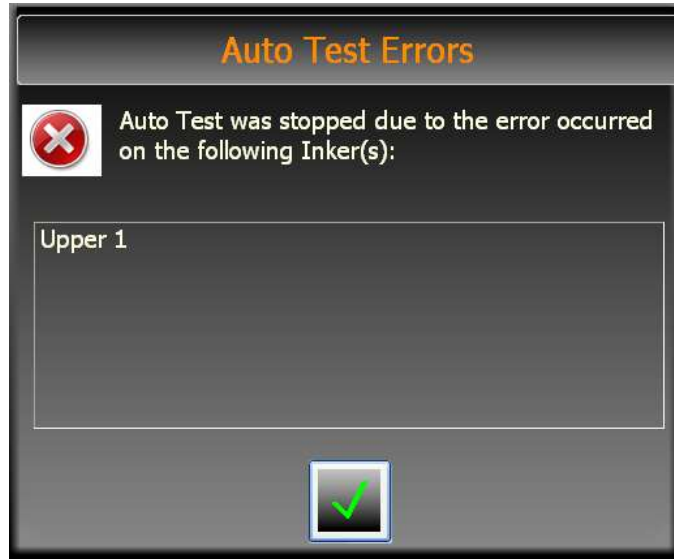


4 If errors display on the screen during the test, click  to end the test.

**NOTE:** Touch  (**Help** button) to access the *Mercury Service Manual* and go directly to the section for the Auto test.

## 7.4.2 Identify Failed Inker(s) During Auto Test


If errors are detected with one or more inkers during Auto Test, the application server stops the test and displays an error dialog.

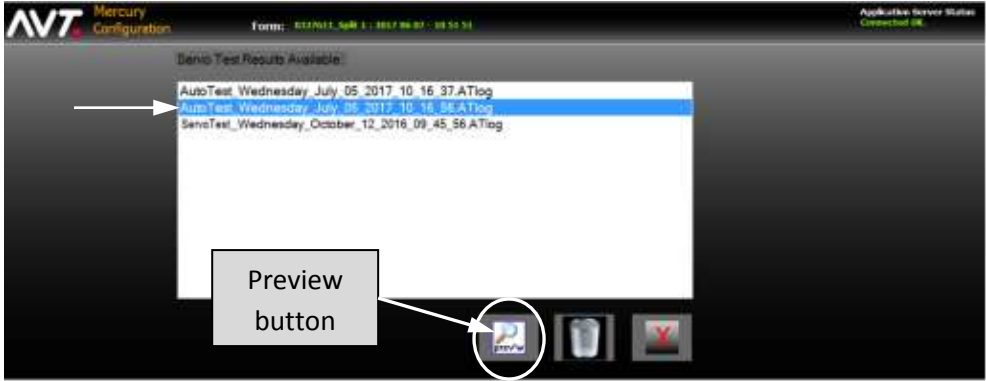


This will let you know why the test stopped and identify which inker(s) are having issues before finishing the full Auto Test.

## 7.5 Viewing Available Auto Test and Servo Test Results

You can use the History diagnostics tool to view the **Servo Test Results Available** for both Auto and Servo tests.

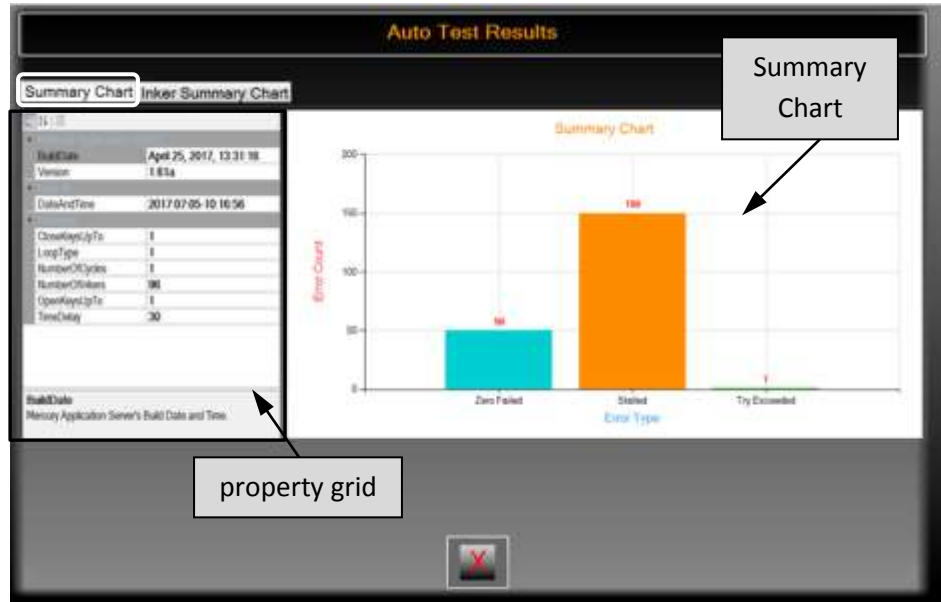
1 Touch the **History** button  from **Mercury Configuration > Diagnostics** and the Mercury Configuration screen displays with the list of Servo Test Results Available.



**NOTE:** The displayed list will include both Servo and Auto test results.

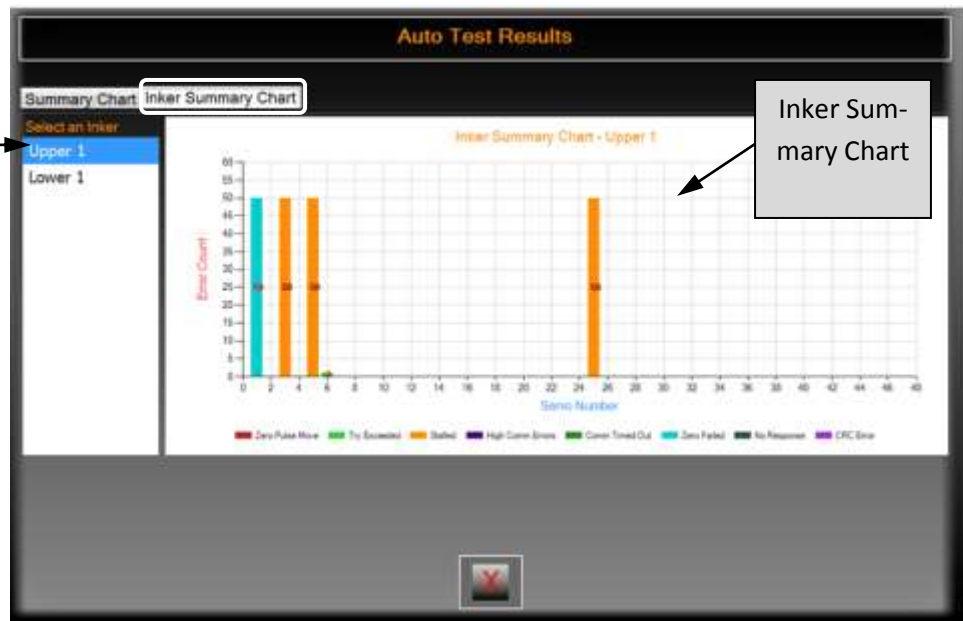
2 Touch a **test** in the list and then touch the **Preview** button .

In this example, the Auto Test Results screen displays with the **Summary Chart** selected.



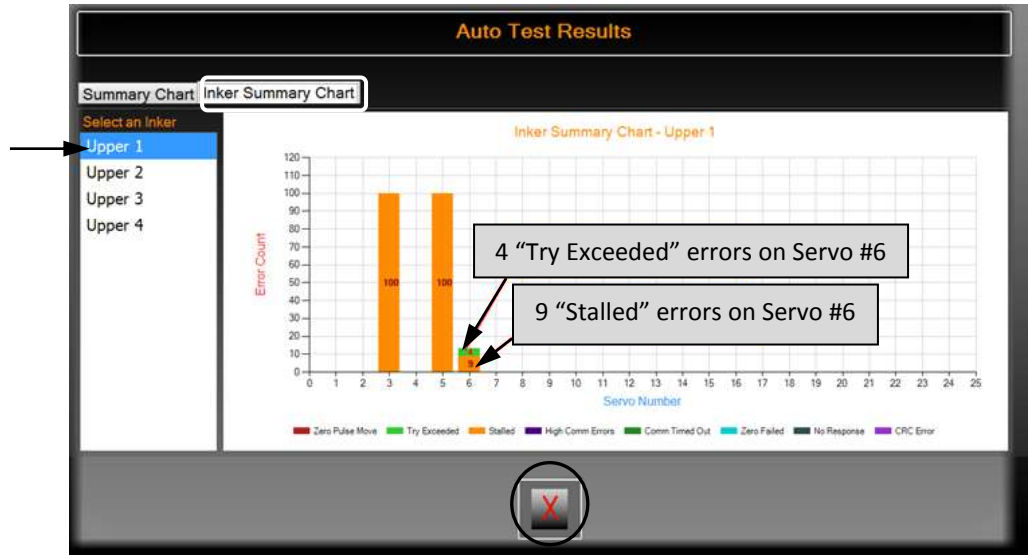
- The Summary Chart displays the servo "Error Type" on the X axis and the "Error Count" on the Y axis.
- The property grid displays information about the Mercury Application Server, the servo test configuration settings, and the build date.


3 Touch the **Ink Summary Chart** tab and the Ink Summary Chart displays. Touch an **ink** in the list to view the Inker Summary Chart.



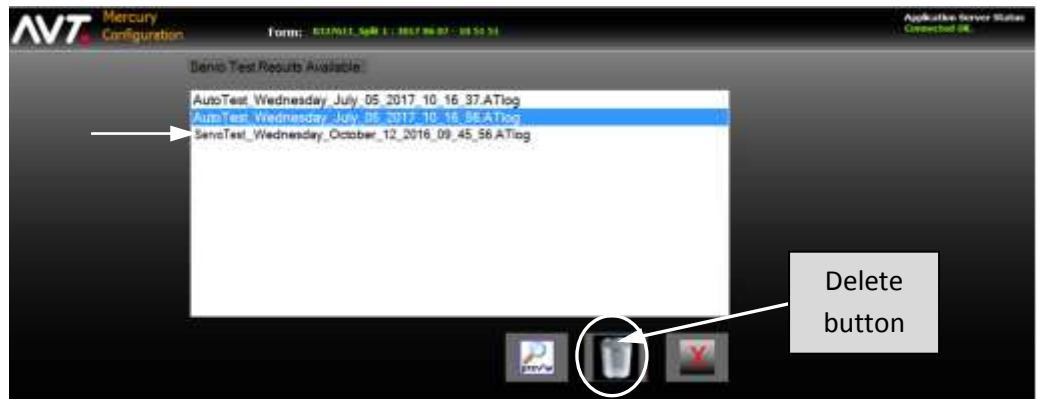



If a servo has multiple errors, then servo error types would be stacked up, as shown in the following example.



4 Touch  to close the Servo Test Results screen and return to the Mercury Configuration screen that displays with the Servo Test Results Available.


5 To delete a test, touch a **test** in the list and then touch the **Delete** button.

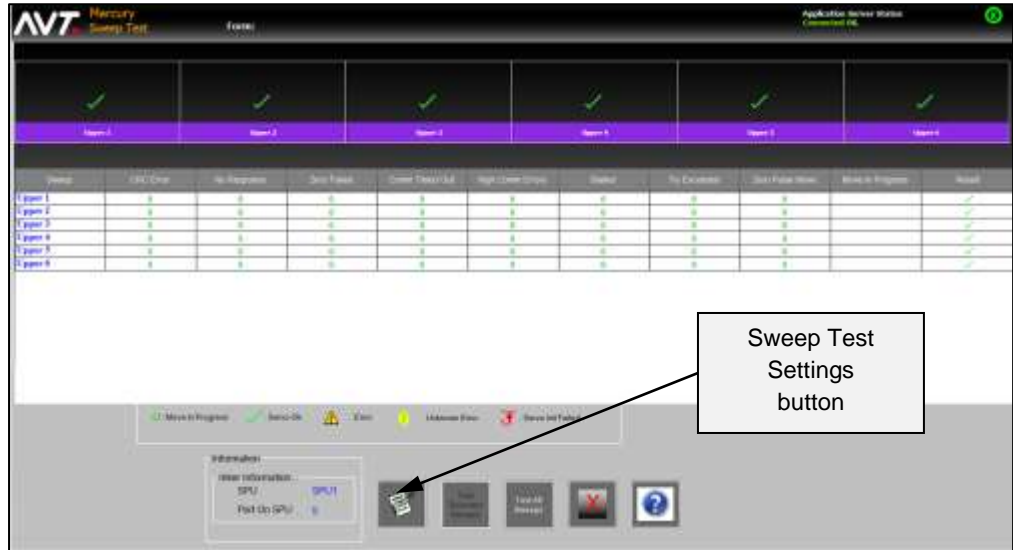


6 Touch  to close the History diagnostics tool.

## 7.6 Running Sweep Test

You can use the Mercury Sweep test diagnostic tool to test one or more sweeps.

- 1 Touch the **Sweep** button  from **Mercury Configuration > Diagnostics** and the Sweep Test screen displays.



- 2 Touch the **Sweep Test Settings** button, specify the settings, and touch .



- Specify the **Number of cycles**.
- Specify the **Open Sweeps up to**.
- Click on the **Time Delay** drop-down box and select **1, 30, or 60** seconds.

- 3 To test selected sweeps, touch one or more **servos** and then touch the **Test Selected Sweeps** button.


When the test completes, the results display on the screen.



- 4 To test all sweeps, touch the **Test All Sweeps** button.

When the test completes, the results display on the screen.




- 5 If errors display on the screen during the test, click  to stop the sweep test. **NOTE:** After the test completes, the Stop button becomes an Exit button.

- 6 After the sweep test is complete, click  when the following prompt displays.



This reminds you that zeroing of all sweeps will occur automatically. It is necessary to zero all sweeps after a sweep test, to obtain accurate positioning during future use.

**NOTE:** Touch  (Help button) to access the *Mercury Service Manual* and go directly to the section for the Sweep test.

## 7.7 Viewing SPU Configuration

You can use the SPU Configuration Display diagnostic tool to view what serial communication port is attached to each SPU.

- 1 Touch the **SPU Configuration Display** button  from **Mercury Configuration > Diagnostics** to view the SPU Configuration Display screen.



- 2 For SPU3 devices, you can control the SPU display to access the HTML page of the SPU3 device. Clicking on the SPU3 controls will bring up the default HTML browser, where you can see the HTML pages of that SPU device.



**NOTE:** To see the HTML page, the SPU3 selection must contain a valid IP address and Ethernet cable connecting SPU3 to the Mercury network.

- 3 Click  on the SPU Configuration Display screen to return to the Mercury Configuration screen.

## 7.8 Viewing SPU Diagnostic Messages

The Mercury system will store diagnostic data in the **D:\GMIMC3\logs** folder. New log files will be created each day.

### Diagnostic Message Naming Convention

The naming convention for log files is **SPUx.LOG**.

Use Notepad, WordPad, or any other text editor to open this file and view the diagnostics for SPU operations.

A sample excerpt is shown below.

```
2017-03-29-22:31:44:399 -SPU1[SPUCONTROLLER, TX]PORT( 0 )
2017-03-29-22:31:44:399 -SPU1[SPUCMD] GET VERSION
2017-03-29-22:31:44:399 -SPU1[SPUCONTROLLER, TX] [23 4 ]
2017-03-29-22:31:44:399 -SPU1[SPUCONTROLLER, WAIT] Wait for TX IDLE
2017-03-29-22:31:44:399 -SPU1[SPUCONTROLLER, WAIT] TX CHANNEL CLEAR
2017-03-29-22:31:44:399 -SPU1[SPUCONTROLLER [ SPU1 ] Send CMD to SPU: [ CMND: 0x023, PORT: 0 ]
2017-03-29-22:31:45:040 -SPU1[SPUCONTROLLER, RX] RESPONSE, PORT( 0 )
2017-03-29-22:31:45:040 -SPU1[SPUCMD] GET VERSION
2017-03-29-22:31:45:040 -SPU1[SPUCONTROLLER, RX DATA] [23 12 0 0 0 3 5F 3F5 69A9 ]
2017-03-29-22:31:45:040 -SPU1[SPUCONTROLLER, TX]PORT( 0 )
2017-03-29-22:31:45:040 -SPU1[SPUCMD] SET_SERVOS_PER_UNIT
2017-03-29-22:31:45:040 -SPU1[SPUCONTROLLER, TX] [17 1C 0 0 0 8 19 19 19 19 0 0 4 4 ]
2017-03-29-22:31:45:041 -SPU1[SPUCONTROLLER, WAIT] Wait for TX IDLE
2017-03-29-22:31:45:041 -SPU1[SPUCONTROLLER [ SPU1 ] Send CMD to SPU: [ CMND: 0x017, PORT: 0 ]
2017-03-29-22:31:45:715 -SPU1[SPUCONTROLLER, RX] RESPONSE, PORT( 0 )
2017-03-29-22:31:45:715 -SPU1[SPUCMD] SET_SERVOS_PER_UNIT
2017-03-29-22:31:45:715 -SPU1[SPUCONTROLLER, RX DATA] [17 E 0 0 0 1 1 ]
2017-03-29-22:31:45:716 -SPU1[SPUCONTROLLER, TX]PORT( 0 )
2017-03-29-22:31:45:716 -SPU1[SPUCMD] SET_UNITS_RUN_ORDER
2017-03-29-22:31:45:716 -SPU1[SPUCONTROLLER, TX] [18 1C 0 0 0 8 3 3 3 3 4 4 1 1 ]
2017-03-29-22:31:45:716 -SPU1[SPUCONTROLLER, WAIT] Wait for TX IDLE
2017-03-29-22:31:45:716 -SPU1[SPUCONTROLLER, WAIT] TX CHANNEL CLEAR
2017-03-29-22:31:45:716 -SPU1[SPUCONTROLLER [ SPU1 ] Send CMD to SPU: [ CMND: 0x018, PORT: 0 ]
2017-03-29-22:31:46:441 -SPU1[SPUCONTROLLER, RX] RESPONSE, PORT( 0 )
2017-03-29-22:31:46:441 -SPU1[SPUCMD] SET_UNITS_RUN_ORDER
2017-03-29-22:31:46:441 -SPU1[SPUCONTROLLER, RX DATA] [18 E 0 0 0 1 1 ]
2017-03-29-22:31:46:442 -SPU1[SPUCONTROLLER, TX]PORT( 7 )
2017-03-29-22:31:46:442 -SPU1[SPUCMD] FAST_FILL_UNIT_ALL
2017-03-29-22:31:46:442 -SPU1[SPUCONTROLLER, TX] [9 14 7 0 A 4 2 2 2 2 ]
2017-03-29-22:31:46:442 -SPU1[SPUCONTROLLER, WAIT] Wait for TX IDLE
2017-03-29-22:31:46:442 -SPU1[SPUCONTROLLER, WAIT] TX CHANNEL CLEAR
2017-03-29-22:31:46:442 -SPU1[SPUCONTROLLER [ SPU1 ] Send CMD to SPU: [ CMND: 0x09, PORT: 7 ]
2017-03-29-22:31:47:168 -SPU1[SPUCONTROLLER, RX] RESPONSE, PORT( 7 )
2017-03-29-22:31:47:169 -SPU1[SPUCMD] FAST_FILL_UNIT_ALL
2017-03-29-22:31:47:169 -SPU1[SPUCONTROLLER, RX DATA] [9 E 7 0 0 1 1 ]
2017-03-29-22:31:47:169 -SPU1[SPUCONTROLLER, TX]PORT( 7 )
2017-03-29-22:31:47:169 -SPU1[SPUCMD] FAST_FILL_UNIT_ALL
2017-03-29-22:31:47:169 -SPU1[SPUCONTROLLER, TX] [9 14 7 0 7 4 0 0 0 0 ]
2017-03-29-22:31:47:169 -SPU1[SPUCONTROLLER, WAIT] Wait for TX IDLE
```

## 7.9 Reviewing Diagnostic Error Codes

### Servo Error Codes

The servo error codes appear in a series, following a diagnostic message like this:

```
Received from SPU#1 GET_SERVO_ERR_STATUS_UNIT
[1D 64 1 0 0 10 ] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

SPU II Servo Error Code (Hex)	Meaning	Action
0	There were no errors.	No action required if unit code is also 0.
1	There was a servo communication error.	If the error recurs, replace the servo. If the problem persists, check the line for interference.
2	Servo did not respond when SPU tried to initialize it.	Check connection for first servo on the bank that shows this error.
4	Servo did not reach zero.	Replace the servo.
8	Too many communication attempts.	Make sure the servo is securely connected to the servo harness. If it is, test the servo (see the <i>Mercury Training &amp; User's Guide</i> ) and replace it if necessary.
10	Too many communication errors.	Make sure the servo is securely connected to the servo harness. If it is, test the servo (see the <i>Mercury Training &amp; User's Guide</i> ) and replace it if necessary.
20	The servo stalled (position error).	Check to see if ink key is stuck.
40	Too many move tries.	Push <b>run</b> to try again to run servo. If the problem continues, check to see if the key is sticking. If the key moves freely, the servo calibration may be off.  You can also test the servo (see the <i>Mercury Training &amp; User's Guide</i> ).

**NOTE:** If more than one error code appears for the same servo, they will be added together (in hexadecimal) and displayed.

## Unit Error Codes

Unit error codes follow a message like the one below:

```
Received from SPU#1 GET_UNIT_STATUS
[1F E 1 22 0 1 ] 0
```

SPU II Servo Error Code (Hex)	Meaning	Action
0	There were no errors.	No action required.
1	Unit failure. The SPU II could not communicate with any servo on this fountain.	The first servo on the fountain may be disconnected or faulty. Use the Servo Test ( <i>Mercury Training &amp; User's Guide</i> ) to isolate the problem.
5	Configuration Error and Servo Error.	A servo on the fountain may be disconnected or faulty. Check to see if there is a servo error code 2, indicating the servo did not respond.
10	Communication error with at least 1 servo.	Push <b>run</b> to try again. Check to see if a servo error code 1 appears (previous page).
1C	Servo and unit error. The move took too long, so the unit timed out. Communication error with 1 or more servos.	Try to identify the servo causing the communication error. If the optional Utility Disk is available, use Autotest.
20	Unit position error. At least one servo did not reach the correct position.	Push <b>run</b> to try again. Check to see if a servo error code 20 appears (previous page).

**NOTE:** If more than one error code appears for the same SPU, they will be added together (in hexadecimal) and displayed.



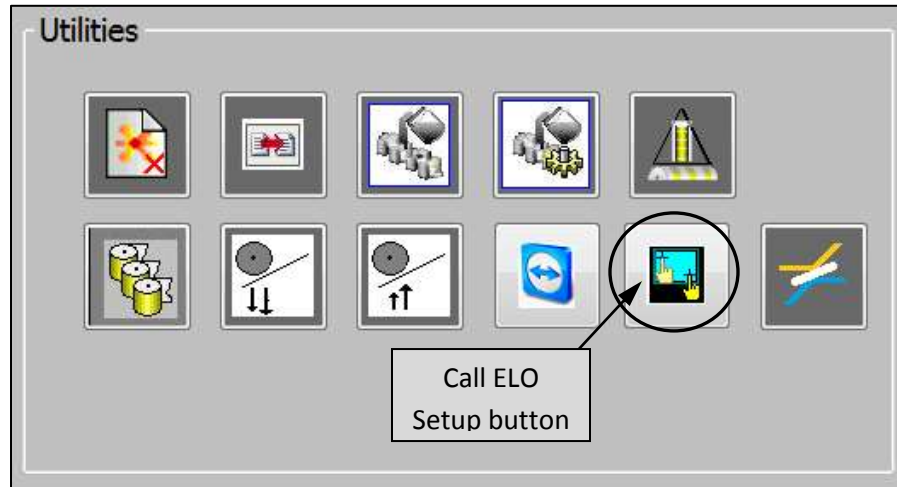
## 8 ELO Touch Calibration

This section describes how to execute ELO touchscreen calibration.

Mercury uses the ELO touchscreen monitor for basic GUI display. Access to this calibration from the Mercury workstation makes it easier for users to calibrate the touchscreen.

### 8.1 Invoking ELO Touch Calibration

You access ELO touchscreen calibration by touching the **Call ELO Setup** button under the **Utilities** section of the **Mercury Configuration** view.


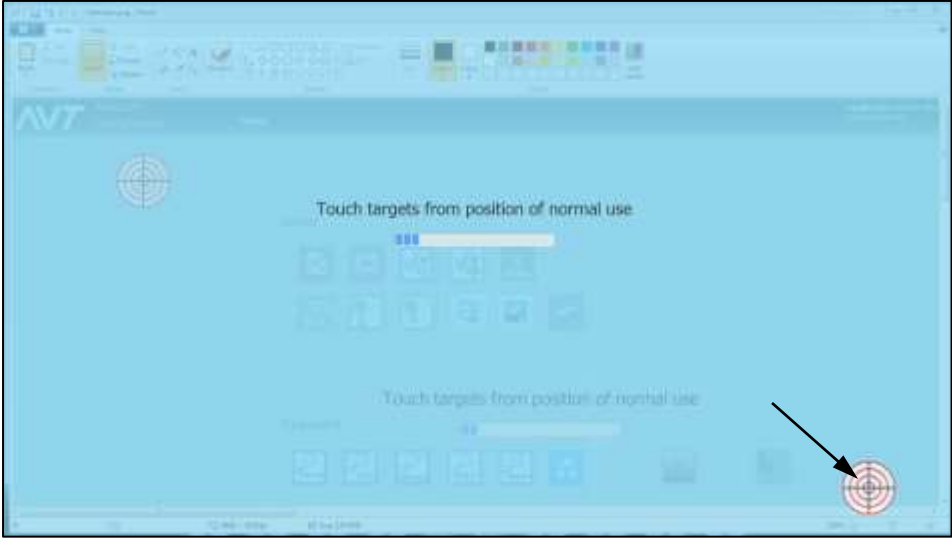





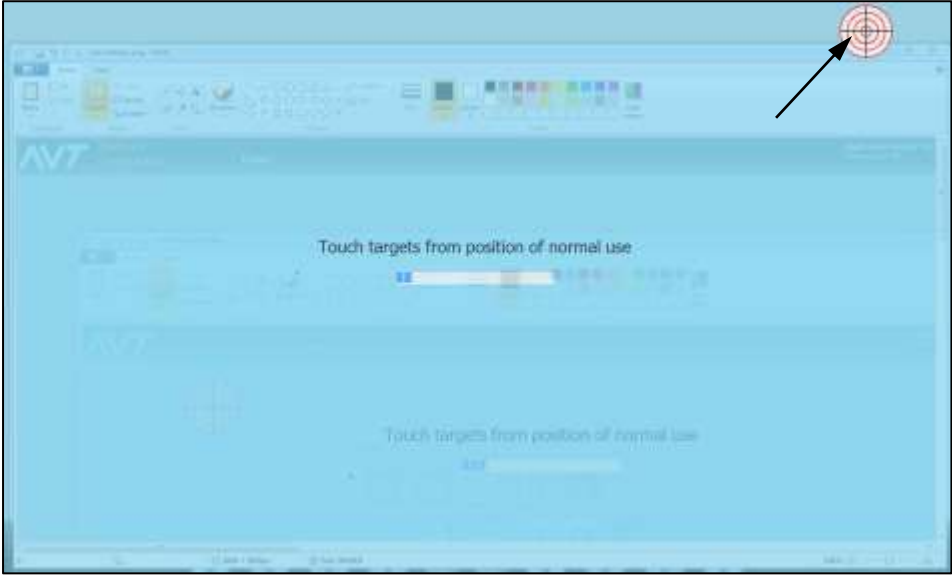
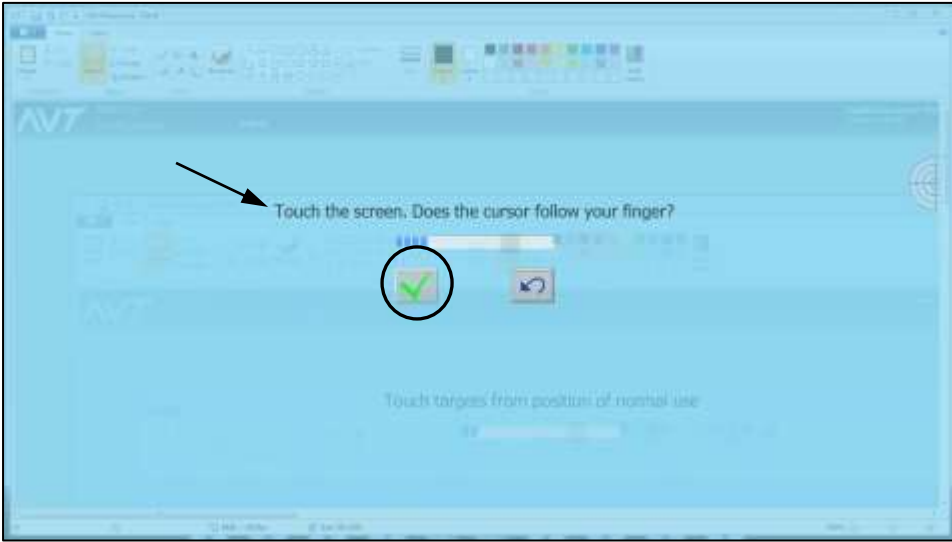

The ELO calibration application launches via the following shortcut, located at the Client.exe location:

**C:\GMI\MC3\MC3Client\MyEloSetup.Ink**

The Call ELO Setup button will be grayed out when the shortcut is not found.

## 8.2 Performing ELO Touch Calibration

1	<p>Touch the <b>Call ELO Setup</b> button under Utilities.</p> <p>A succession of four screens displays for you to calibrate the ELO touch system for a specific monitor.</p>
2	<p>On screen #1, touch the <b>target box</b> () located on the lower right corner of the screen.</p> 
3	<p>On screen #2, touch the <b>target box</b> () located on the upper left corner of the screen.</p> 

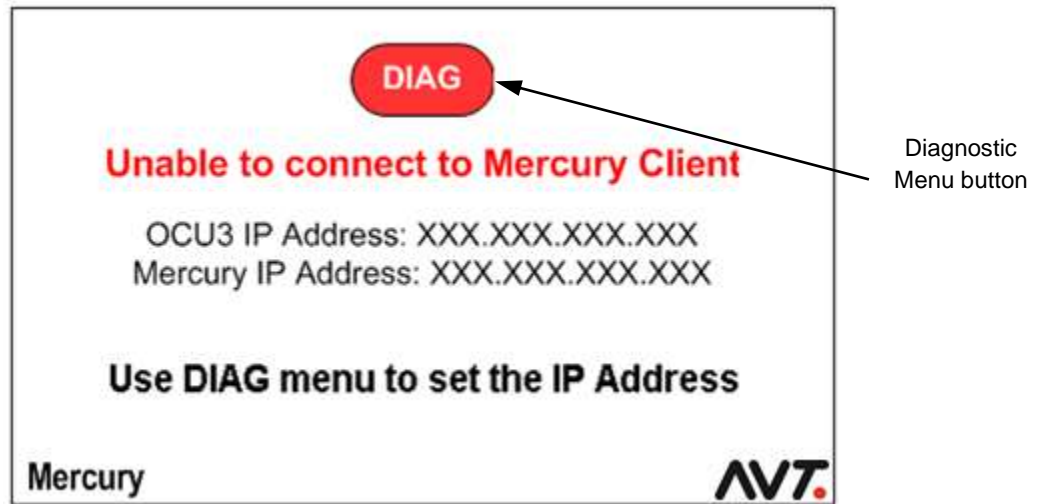
<p><b>4</b></p>	<p>On screen #3, touch the <b>target box</b> () located on the upper right corner of the screen.</p> 
<p><b>5</b></p>	<p>On screen #4 (the calibration checking verification screen), check that the cursor follows your finger when you touch and drag it on the screen.</p> 
<p><b>6</b></p>	<p>Click  to verify that the ELO touch system is calibrated correctly.</p>

## 9 OCU3 System Configuration and Service

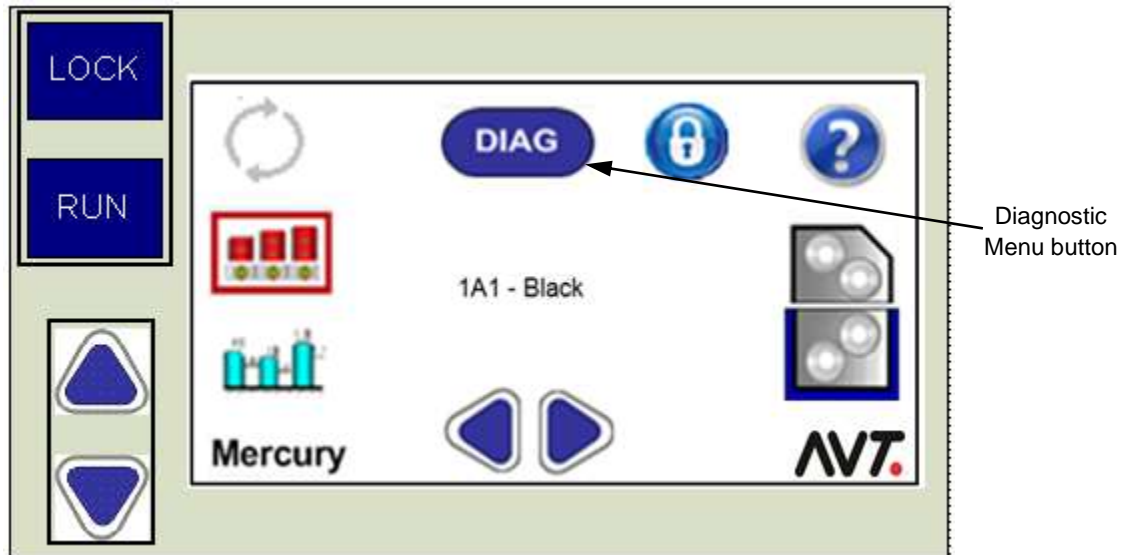
### 9.1 Configuring the OCU3 System

This section describes the diagnostic mode on the OCU3 console.

The following screen displays when TCP/IP communication needs to be established between OCU3 and Mercury.



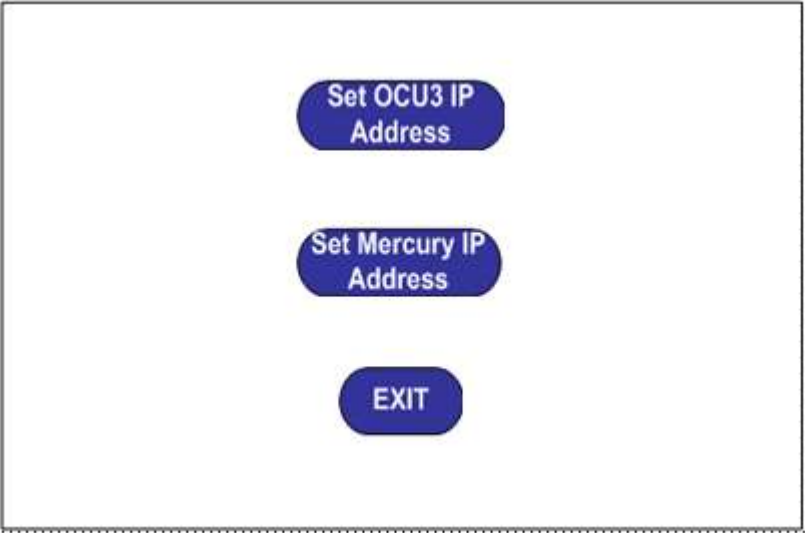


The following screen displays when TCP/IP communication is successfully established between OCU3 and Mercury.

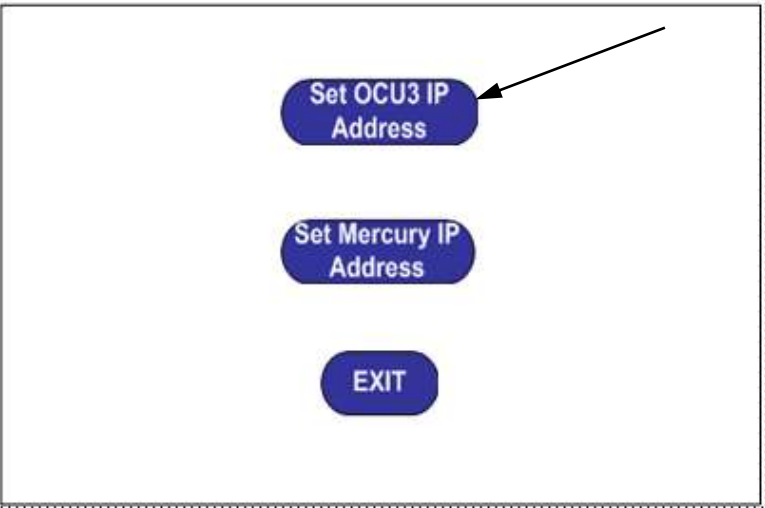

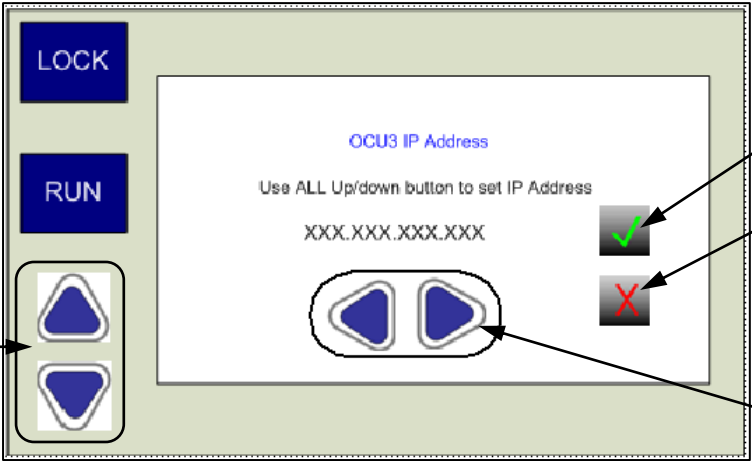





### 9.1.1 Access OCU3 Diagnostic Controls

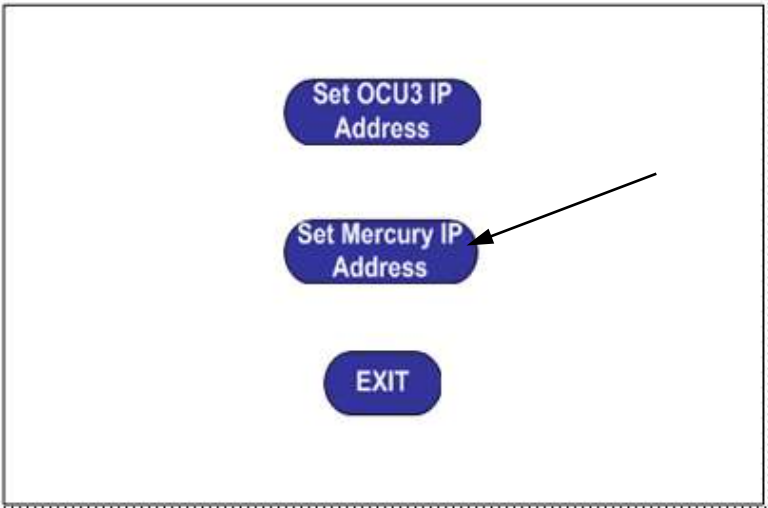

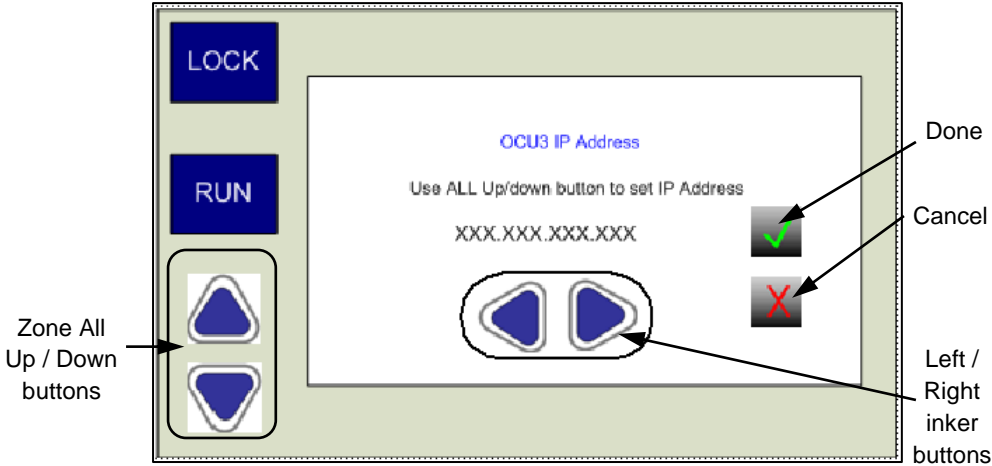



A password is required to access the Mercury OCU3 diagnostic controls.

<p>1</p>	<p>Touch the <b>DIAG</b> button on the OCU3 touchscreen. The Enter password keypad displays.</p> 
<p>2</p>	<p>Enter the four-digit code <b>2012</b> on the keypad and then touch . The OCU3 IP Address controls will display on the screen.</p> 

## 9.1.2 Configure OCU3 IP Address

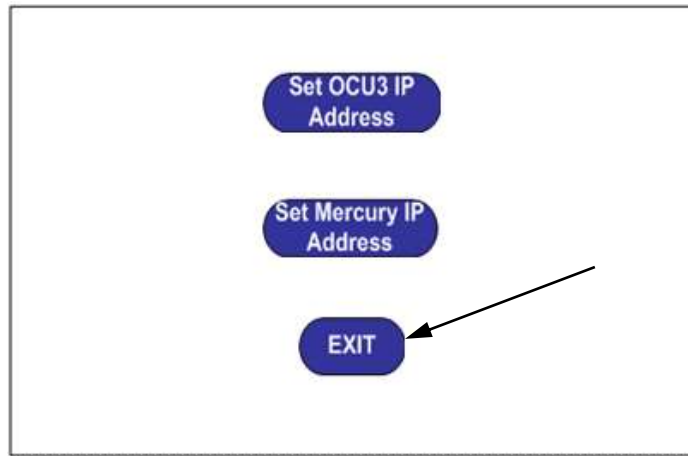
<p>1</p>	<p>After entering the password to access the OCU3 diagnostic controls, touch <b>Set OCU3 IP Address</b>.</p> 
<p>2</p>	<p>Use the  buttons to move through the areas of the IP address (XXX.XXX.XXX.XXX).</p> 
<p>3</p>	<p>Use the  buttons to increase/decrease value by 1 or hold down buttons to increase/decrease value by 10. (Range is 0-255).</p>
<p>4</p>	<p>Touch  or .</p>

### 9.1.3 Configure Mercury IP Address

<p>1</p>	<p>After entering the password to access the OCU3 diagnostic controls, touch <b>Set MC3 Client IP Address</b>.</p> 
<p>2</p>	<p>Use the  buttons to move through the areas of the IP address (XXX.XXX.XXX.XXX).</p> 
<p>3</p>	<p>Use the  buttons to increase/decrease value by 1 or hold down buttons to increase/decrease value by 10. (Range is 0-255).</p>
<p>4</p>	<p>Touch  or .</p>

## 9.1.4 Exit Diagnostic Mode

Touch the **EXIT** button.



The system automatically validates that the IP addresses are set correctly and initializes the console.

## 9.1.5 Perform OCU3 Touch Calibration

This section describes how to perform the touch calibration process on the Master Control Board of the OCU3 system.

### OCU3 Touch Calibration Access

You access the OCU3 Touch Calibration menu by touching the **Lock** and **Zone All Down** buttons simultaneously on the OCU3 Master Control Board.

**NOTE:** You can only access the Touch Calibration menu when Mercury is offline.

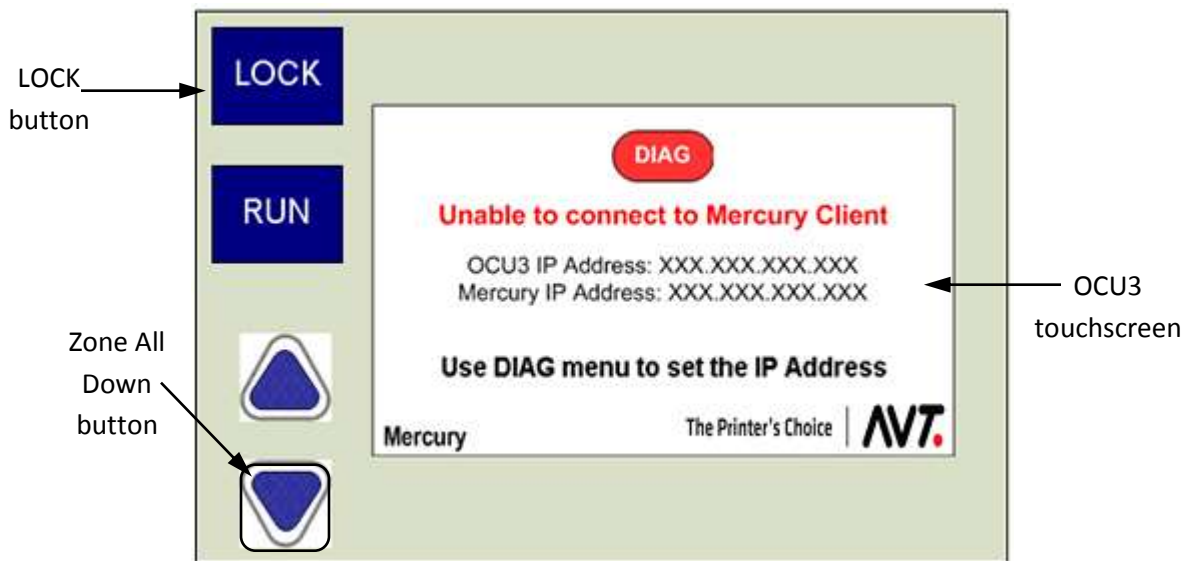


Figure 7.1: OCU3 Master Control Board

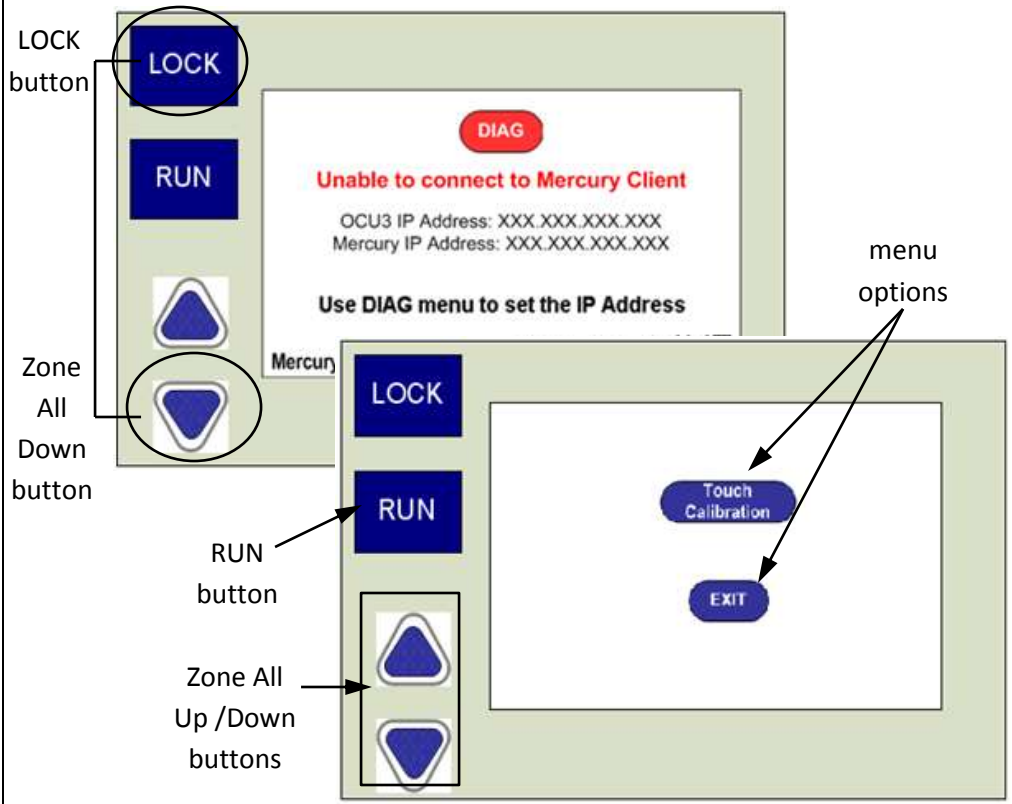


## OCU3 Touch Calibration Steps

Following are the steps for OCU3 touch calibration. The system calibrates on three points and then asks you to verify the four corners.

**Hint: Make sure to read this entire procedure before starting the touch calibration process. You will only have 5 seconds to do each step in the process.**

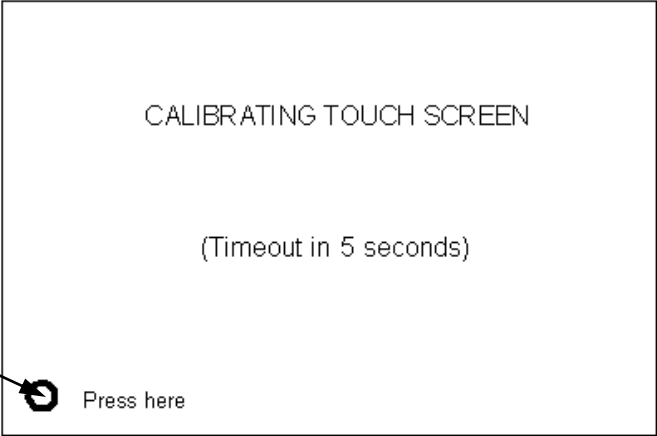
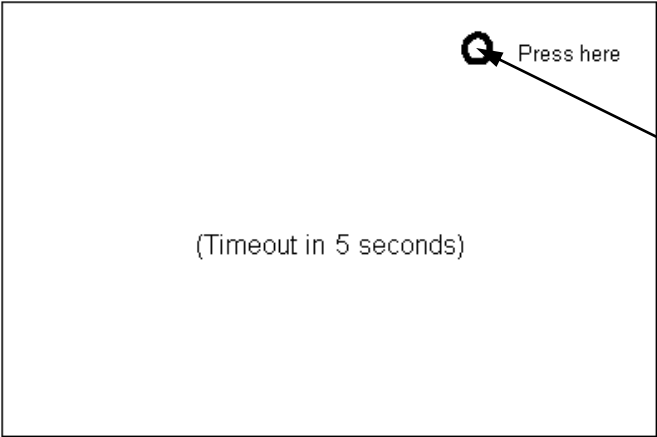
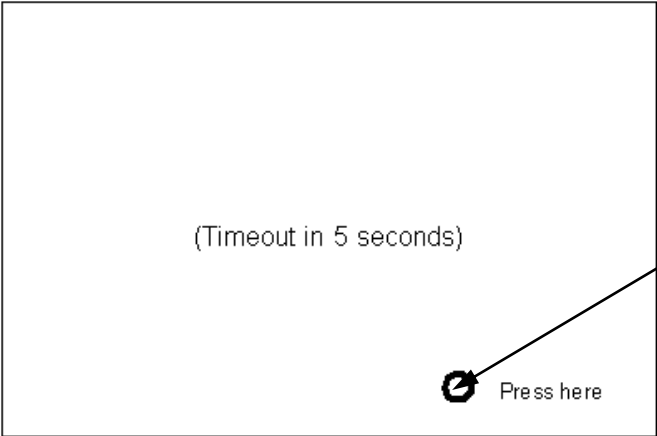
**1** Touch the **LOCK** and **All Zone Down** buttons simultaneously on the Master Control Board.

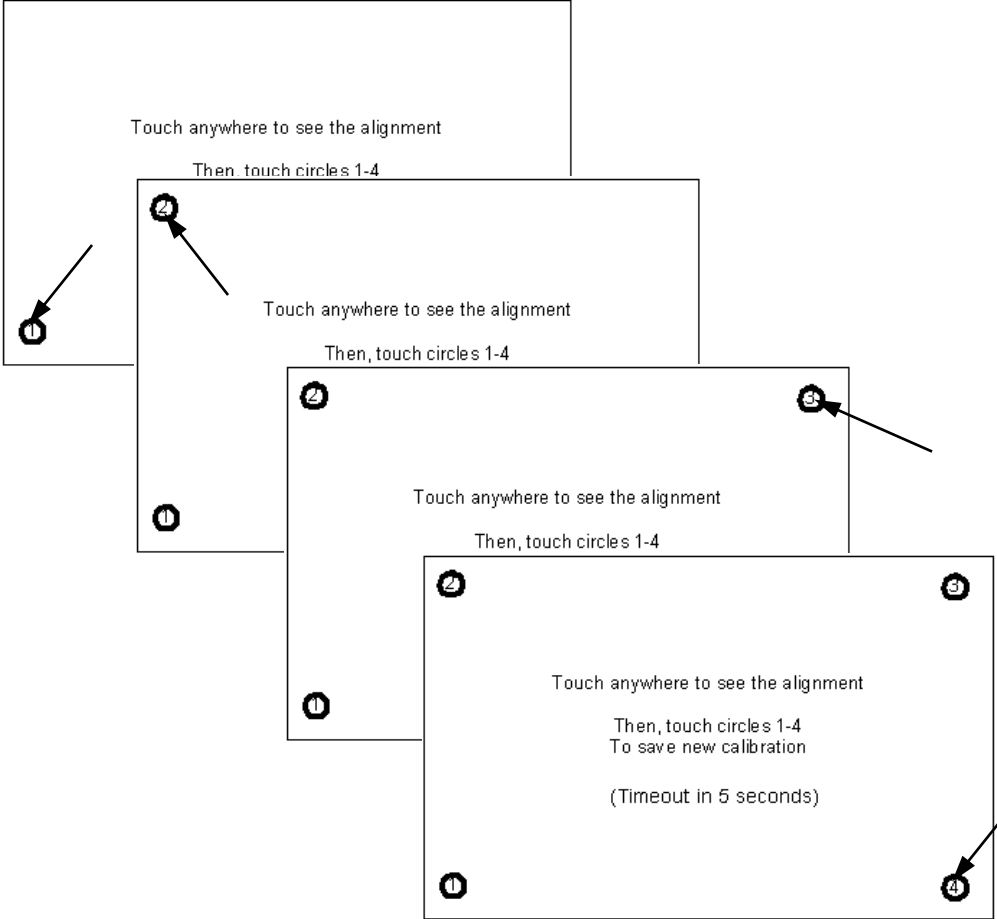
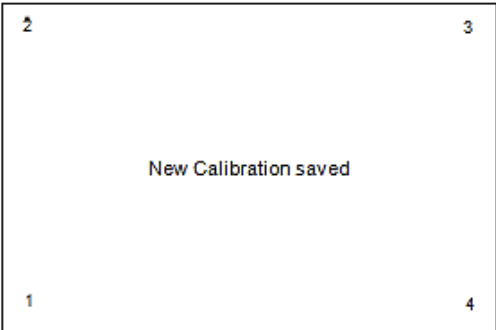


The diagram illustrates the Master Control Board interface. On the left, there are four buttons: a blue 'LOCK' button (circled), a blue 'RUN' button, a blue 'Zone All Up' button (triangle pointing up), and a blue 'Zone All Down' button (triangle pointing down) (circled). On the right, there are two more buttons: a blue 'LOCK' button and a blue 'RUN' button. Below these are two blue 'Zone All Up/Down' buttons (triangles pointing up and down). The central screen displays a red 'DIAG' button at the top, followed by the text 'Unable to connect to Mercury Client', 'OCU3 IP Address: XXX.XXX.XXX.XXX', 'Mercury IP Address: XXX.XXX.XXX.XXX', and 'Use DIAG menu to set the IP Address'. Below the screen, there are two blue buttons: 'Touch Calibration' and 'EXIT'. Arrows point from the labels to the corresponding buttons and screen elements.

- Use the **Zone All Up/Down** buttons to scroll menu options.
- Use the **RUN** button to select desired menu option.

**IMPORTANT:** Once the series of Touch Calibration screens start displaying, you will have only 5 seconds on each screen to touch the displayed circle. As you touch each circle, you will see an “X” appear in the circle.

<p><b>2</b></p>	<p>Touch the <b>Touch Calibration</b> button and the Calibrating Touch Screen displays.</p> 
<p><b>3</b></p>	<p>Touch the <b>“Press here” circle</b> at the bottom left corner.</p> 
<p><b>4</b></p>	<p>Touch the <b>“Press here” circle</b> at the top right corner.</p> 

<p><b>5</b></p>	<p>Touch the “<b>Press here</b>” circle at the bottom right corner. A series of screens will now display for you to validate the new calibration.</p> 
<p><b>6</b></p>	<p>Touch series of numbered circles (1-4) to validate and save new calibration.</p> 

When the “New Calibration saved” message displays, the touchscreen utility is enabled on the Master Control Board.

### 9.1.6 Review IP Address Guidelines

See the *Ethernet Install Guide - Windows Clients & Servers* (P/N 090S900075) for detailed information on IP address guidelines.

## 9.2 Servicing the OCU3 System

To service the OCU3 console unit, remove the front, upper screws on both sides and lift up the top of the console unit.

**Note:** AVT Customer Service will typically provide all service to the OCU3 system.

### 9.2.1 OCU3 Zone Issues

When troubleshooting the OCU3 zones, consider the following possible issues:

- Ribbon connector on individual zone controls may be disconnected or loose
- Bad or shorted backlight LED
- Incorrect firmware in zone PCB
- Overlay membrane switches may have a bad switch (bubble)

#### Check Ribbon Connectors

1 Open the OCU3 case.

**WARNING: Power to the OCU MUST be turned OFF before opening the console.**

- A. Remove the screws on both sides of the console at noted locations (see red arrow), using a large Phillips (crossed) screwdriver (size #2). Only remove the screws at these locations in the upper front.



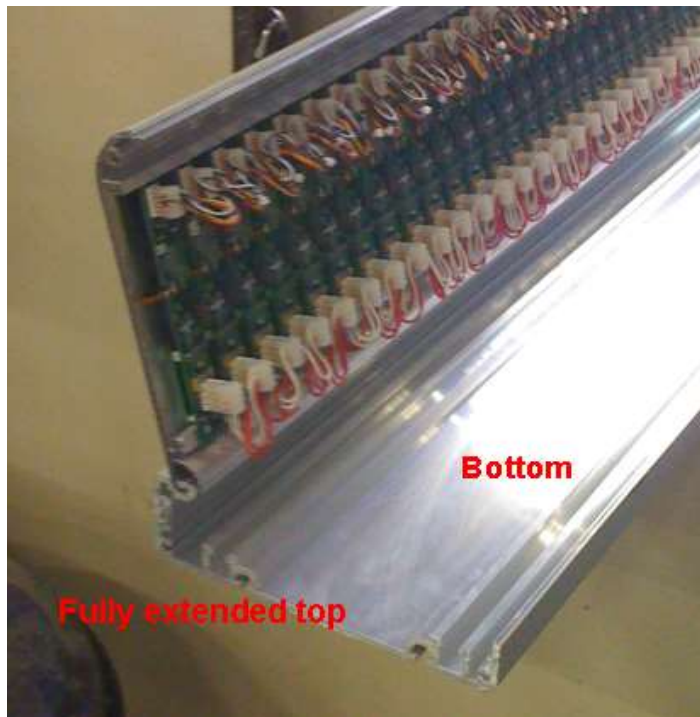
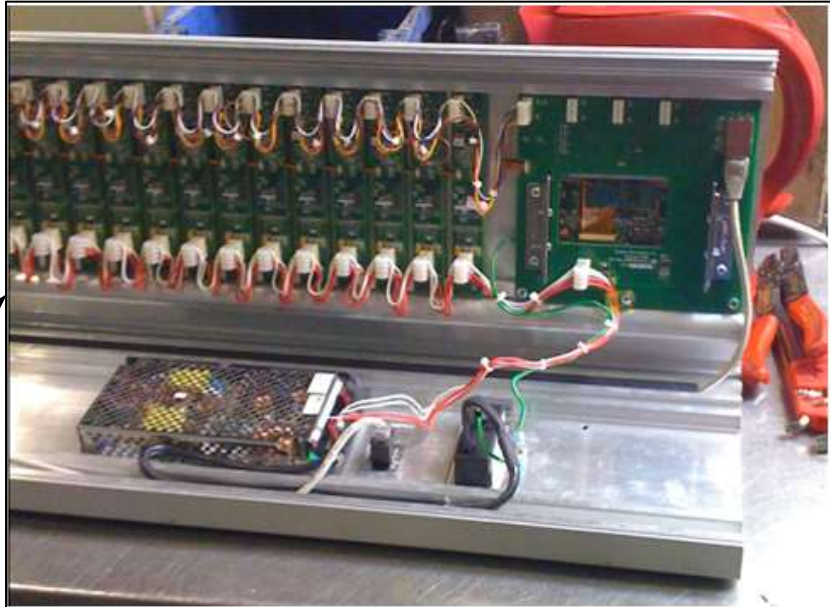
It may help to partly loosen all screws on the end plates.

- B. Pop open the top of the case by gently prying with small flat-head screwdriver. The top of the case hinges from front to back. The front seam of the case is the seam of the top of the case.

Once started, the top of the case will open up a bit before catching on the hinge at the top back.

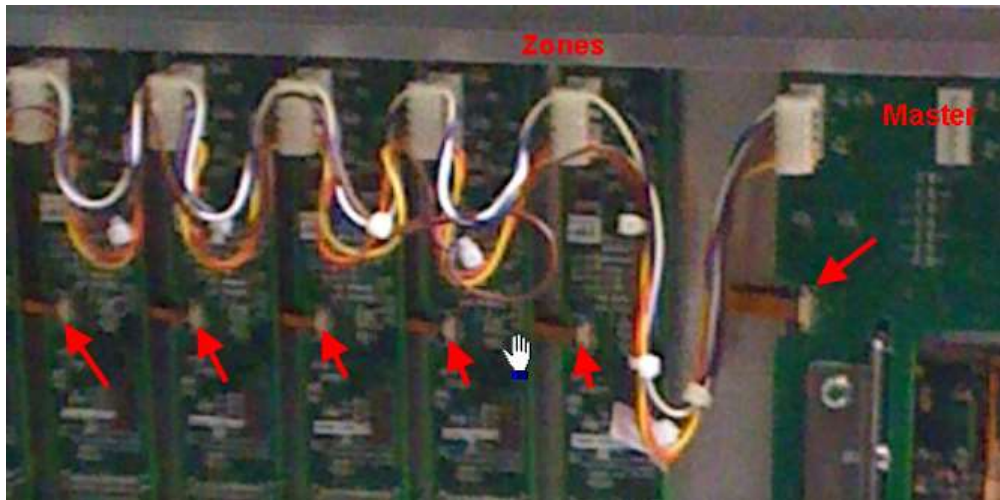
- C. If the top lid sticks before being fully open, push down on the back region while lifting the front. If the case is very long, several places along the length of the case may need help with trying to open the top.

top of case



**2** Check the ribbon cables on the zone PCBs.

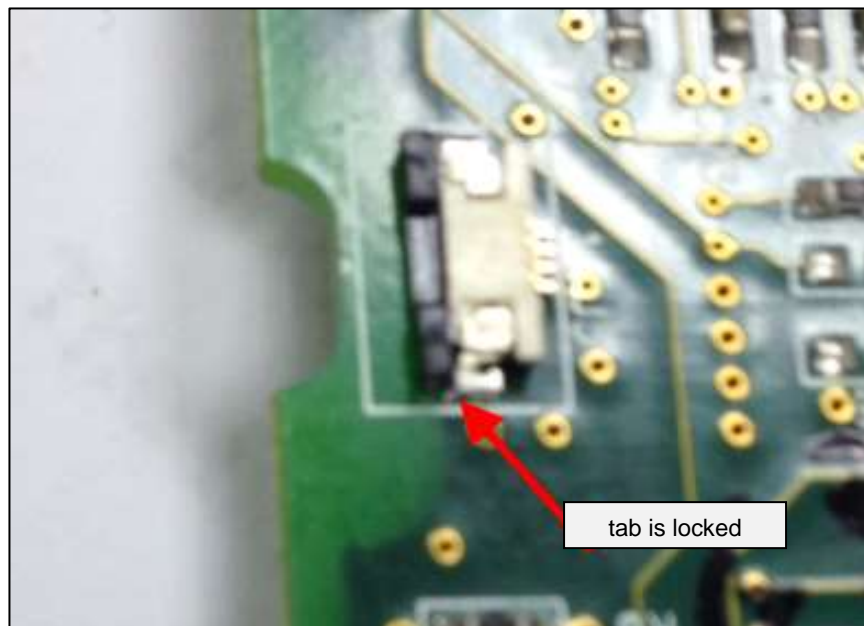
You may need a 10x loop and flashlight to see these connectors clearly.



The two controls (UP and DOWN) for each zone PCB are connected by this ribbon cable.

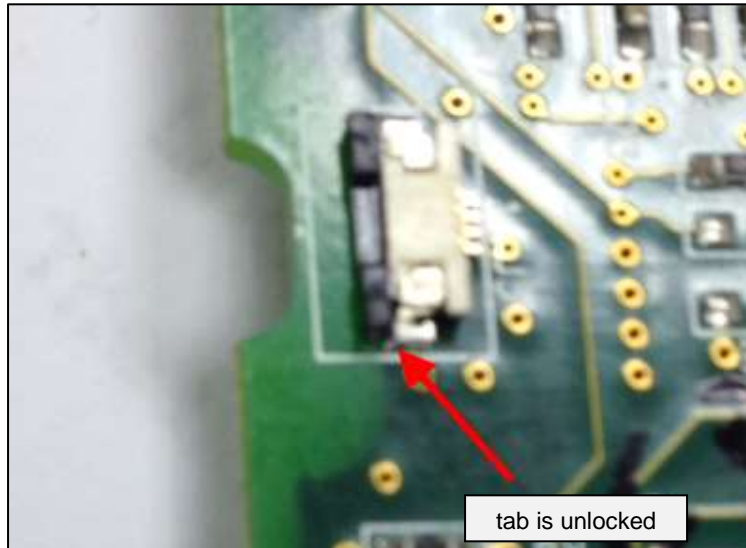
**WARNING: Power MUST be turned OFF on the console before checking the zone ribbon connections.**

- A. Unlock the black locking tab on the left side of the connector, using a small plastic tool. This tab slides to the left to unlock. There are tabs on the top and bottom of the connector.



When the tabs are unlocked (as shown in the figure below), the ribbon cable will be loose.

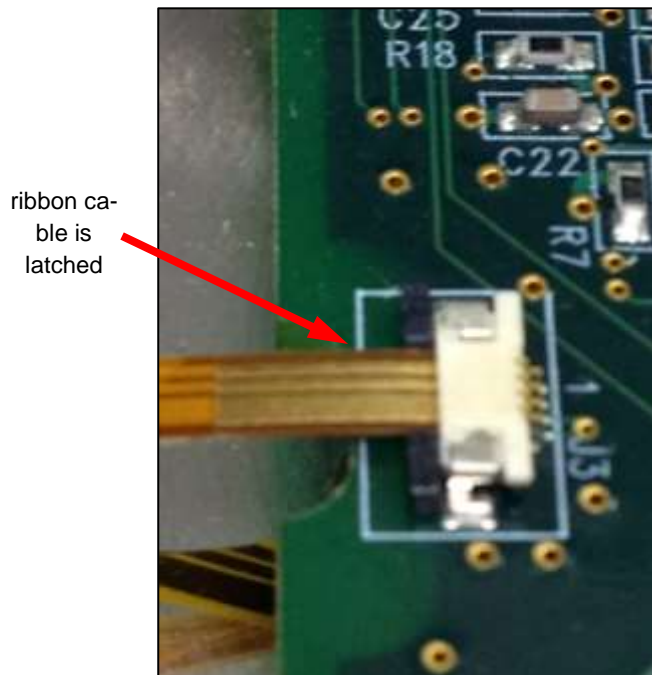




- B. With the locking tab fully extended to the left, insert the ribbon into the connector from the left side.

**Note:** Do not use anything metal to hold the ribbon cable or you will scratch the gold connections on the ribbon.


- C. When the ribbon cable is in place, move the locking tab to the right taking the ribbon cable with it as it travels into the connector.



When the tab is fully seated, the ribbon cable should feel secure in the connector.

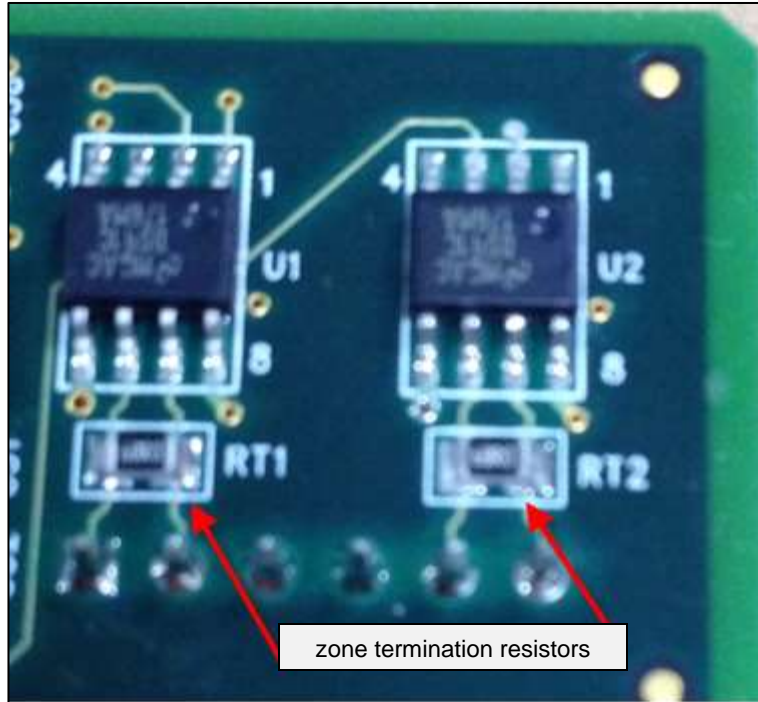
- D. Test the cable being seated in the connector with a careful, gentle pull of the ribbon cable. A hard pull of the ribbon will pull it out of the connector and result in a fault.

## Replace a Zone PCB

1	Open the OCU3 case, following the procedure described in <a href="#">Check Ribbon Connectors</a> .
2	Carefully unlatch and disconnect the faulty zone PCB, following the steps for operating the latches described in <a href="#">Check Ribbon Connectors</a> .  The red and white wire harness is the 5 volt DC power cable. The other harness is for communications. The connectors fit in only one direction.
3	Using a 0.050 inch Allen wrench, remove the PCB that is secured by a small socket screw.
4	Replace the faulty PCB with a new PCB.
5	Using the 0.050 inch Allen wrench, carefully retighten the retaining screws.  Be sure the top of the PCB is inserted into the C channel of the case top and the display is fully visible after the screw is secured.  <div data-bbox="613 877 1105 1318" style="text-align: center;">  <p data-bbox="613 1144 738 1234">top of PCB goes into channel</p> </div>
6	Attach the two harnesses and ribbon cable, as described above.
7	Test the zone controls by powering on the console and checking operation with the Mercury Client. You can do this with the case partially open.
8	Secure the case when all controls are working.

**Note:** There is a special configuration of zone PCB at position #1. This is the PCB that is farthest from the large Master PCB. This “terminating” PCB should contain two terminator resistors, as shown in the figure below.





This type of zone PCB can only be positioned at position #1 and cannot be used in the other zones.

### **Update Firmware**

The firmware version in the zone PCBs must be compatible with the firmware version in the master PCB. Erratic operation of the either PCB may result if there is a mismatch.

Consult AVT Customer Service for instructions on updating firmware in the OCU3.

### **Replace Faulty Membrane Switch**

If pressing on the membrane switch produces no response in the OCU3 and at the Mercury Client, then the membrane switch itself may be defective. These switches are mounted to the OCU3 case with a factory applied adhesive

The ink key servo motors may be controlled from the Mercury Client touchscreen, even if the OCU3 is removed from the site for repair.

## Verify Zone Displays and Switch Controls

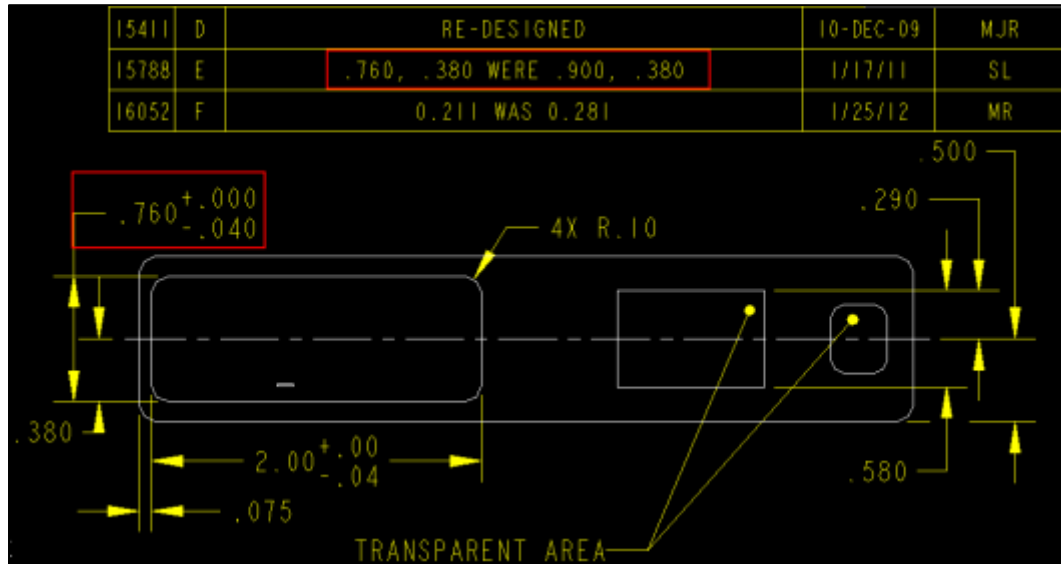
There are two parts of the OCU3 zone controls, which are the membrane switch overlay and the zone PCB with display. You need to verify:

- Is the display working?
- Are the Up/Down switches broken?

The zone PCB comes in two flavors, zone #1 and all the rest of the zones.

050G100291-01 PCB TSTD, OCU3 ZONE WITH TERMN	Zone #1
050G100291-02 PCB TSTD, OCU3 ZONE WOUT TERMN	Rest of Zones
035G100615 SWITCH MEMBRANE, OCU3 ZONE	Up and Down Switches

**Warning: Switch design change of 035G100615, rev E or later.**

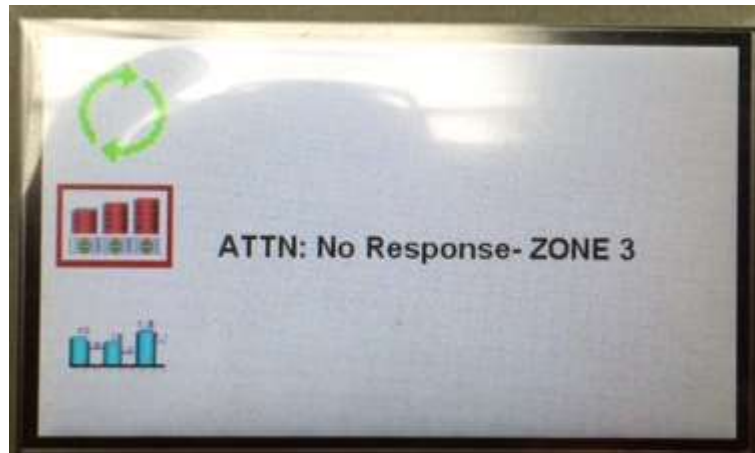


The foam back switch changed from 23 mm width to 19 mm width at the start of 2011. Spares of the older style zone overlay will not fit into the new OCU3 consoles (May 2011 or later).

Be sure your stock of both Dallas and EMEA is marked with correct revision of part.

## 9.2.2 OCU3 Error Messages

The following figure shows an OCU3 error message.

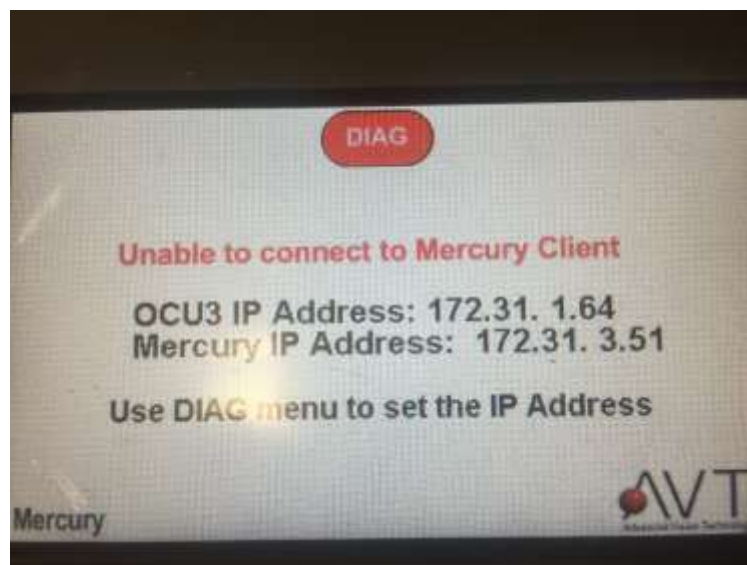


### Power Up Messages

During power up of the OCU3, the Master controller must prepare the zone controllers for use.

Below are some possible messages that may display on the Master Control Board during this process. These messages will be seen if the OCU3 is correctly attached to the Client computer with CAT5 cable and IP addresses are properly set.

Otherwise, the following display will be seen.



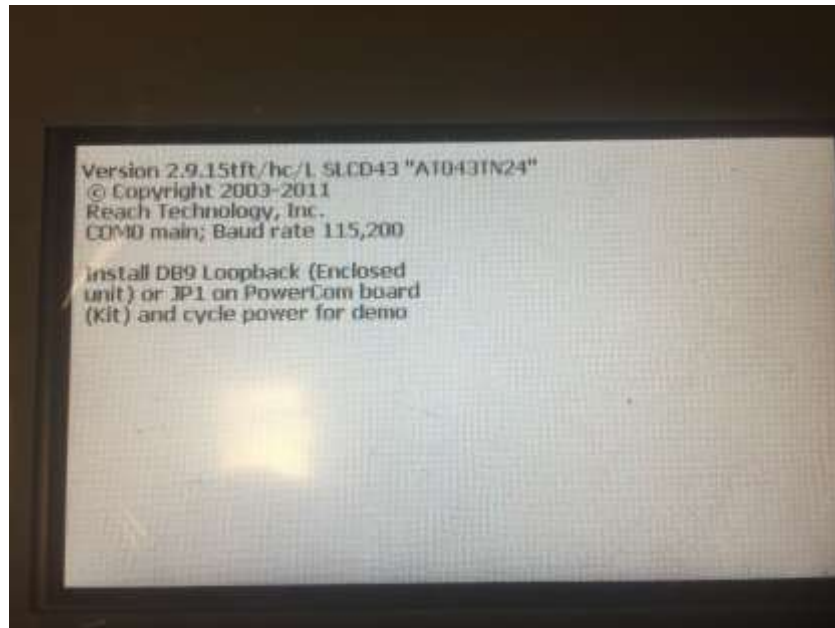
<u>Message</u>	<u>Description</u>
<b>Begin Initializing Zone Board</b>	Start of the zone controller preparation.
<b>Zone xx has INITed</b>	Zone controller xx has been prepared successfully.
<b>Zone Board INIT completed</b>	End of zone controller preparation – successful completion.
<b>Zone boards INIT fail</b>	<p>NONE of the zone controllers could be prepared successfully. Contact AVT for service.</p> <p>Likely reasons are either:</p> <ul style="list-style-type: none"> <li>➤ Bad zone controller #1 (left most zone controller).</li> <li>➤ Bad zone communication harness or no zone controller with terminator present (left most zone controller).</li> </ul>
<b>Attn: Re-initializing Zones</b>	Problem occurred during preparation process and Master controller started zone preparation process over again.
<b>ATTN: No Response ZONE xx</b>	<p>All zones prior to this zone were prepared correctly. This zone timed out and did NOT respond to the Master controller. Contact AVT for service.</p> <p>The cause is likely a bad zone controller xx or bad zone communication harness.</p> <p>Remember zone controller #1 is the left most zone, increasing to the left. The zones are indexed left to right during the initialization process; the index value is displayed on the zone display when this occurs.</p>

You may need to collect further information, as noted below.

1	Do all zones light up when power is turned on? The zone boards will display the AVT logo (A <b>symbol</b> on new zone FW (1.40+) and <b>GMI logo</b> on older FW).
2	What values are seen on the zone controller displays when the error occurs? During the startup process, as each zone controller is initialized, a value is displayed on the zone controller. This value is the index of the console location assigned by the Master controller.
3	Are there any differences in brightness seen on the zone displays? Zone displays should be about the same brightness as when delivered from the factory.

### Error Condition with OCU3 Main Display

If the power is on and the following is seen on the OCU3 main display for a long period of time, there is a problem with the OCU3 Main PCB assy (050G100294) or the PCB Assembly, REACH display controller (050G100298).



As seen here it powers up, but the Master PCB does not start the display updates in graphics mode.

You should check the following items:

- The serial cable (small, white cable) between the display and the Main PCB may have gone bad or is missing.
- The OCU3 Display controller may be bad, confused, or the wrong FW loaded.
- The main OCU3 PCB may be damaged or FW is badly programmed.

## Communication Related Error Messages

<p><b>RequestConfigData-MEM_FULL(SEND_DATA)</b> Master controller RAM is full while requesting Client configuration.</p>
<p><b>RequestConfigData: MEM_FULL(send_basemessage)</b> Master controller RAM is full while requesting Client configuration. (reply)</p>
<p><b>RequestConfigData: ERROR(SendMessage)</b> Unexpected error occurred while requesting Client configuration.</p>
<p><b>RequestCurrentStatus: MEM_FULL(send_data)</b> While requesting current zone and fountain status.</p>
<p><b>RequestCurrentStatus: MEM_FULL(send_basemessage)</b></p>
<p><b>RequestCurrentStatus: Error (SendMessage)</b></p>
<p><b>SendZoneAllUporDown: MEM_FULL(send_data)</b> While sending Zone All or Down changes to client.</p>
<p><b>SendZoneAllUporDown: MEM_FULL(ZoneAllUporDownDetails)</b></p>
<p><b>SendZoneAllUporDown: MEM_FULL(ZoneAllUporDown)</b></p>
<p><b>SendZoneAllUporDown: MEM_FULL(send_basemessage)</b></p>
<p><b>SendLOCKStatus: MEM_FULL(send_data)</b> While sending Lock console status to client.</p>
<p><b>SendLOCKStatus: MEM_FULL(send_basemessage)</b></p>
<p><b>SendLOCKStatus: ERROR(SendMessage)</b></p>
<p><b>SendRUNStatus: MEM_FULL(send_data)</b> While sending Run fountain status to client.</p>
<p><b>SendRUNStatus: MEM_FULL(send_basemessage)</b></p>
<p><b>SendRUNStatus: ERROR(SendMessage)</b></p>

<p><b>SendInkerPressed: MEM_FULL(send_data)</b> While changing fountain selection to client.</p>
<p><b>SendInkerPressed: MEM_FULL(send_basemessage)</b></p>
<p><b>SendInkerPressed: ERROR(SendMessage)</b></p>
<p><b>EncodeBaseMessage: MEM_FULL(send_packet)</b></p>
<p><b>EncodeBaseMessage: MEM_FULL(send_message)</b></p>
<p><b>ParseMC3ClientMessages: MEM_FULL(message)</b> While processing any message from client.</p>
<p><b>ProcessMC3ClientMSG: MEM_FULL(packetHeader)</b></p>
<p><b>ProcessCurrentStatus MEM_FULL(CurrentStatus)</b> While processing the current client status message.</p>
<p><b>ProcessUpdatedZoneR: MEM_FULL(ZoneValue)</b> While processing the zone values from the client.</p>
<p><b>ProcessUpdatedZoneV: MEM_FULL(ZoneValue)</b> While processing the zone auto repeat status from client.</p>
<p><b>SendZoneKeyValue: MEM_FULL(send_data)</b> While sending new zone values to client.</p>
<p><b>SendZoneKeyValue: MEM_FULL(ZoneMessage)</b></p>
<p><b>SendZoneKeyValue: MEM_FULL(ZoneChangeDetails)</b></p>
<p><b>SendZoneKeyValue: MEM_FULL(send_basemessage)</b></p>
<p><b>SendZoneKeyValue: ERROR(SendMessage)</b></p>
<p><b>SendSwitchSurface: MEM_FULL(send_data)</b> While sending request to switch sides to client.</p>
<p><b>SendSwitchSurface: MEM_FULL(send_basemessage)</b></p>

<b>SendSwitchSurface: ERROR(SendMessage)</b>
<b>SendSwitchDisplayMode: MEM_FULL(send_data)</b> While sending request to switch display mode to client.
<b>SendSwitchDisplayMode: MEM_FULL(ChangeInDisplayMode)</b>
<b>SendSwitchDisplayMode: MEM_FULL(send_basemessage)</b>
<b>SendSwitchDisplayMode: Error-SendMessage</b>
<b>SendZoneLockStatusToMercury: MEM_FULL(send_data)</b> While sending zone lock updates to client.
<b>SendZoneLockStatusToMercury: MEM_FULL(ZoneLockStatus)</b>
<b>SendZoneLockStatusToMercury: MEM_FULL(send_basemessage)</b>
<b>SendZoneLockStatusToMercury: ERROR(SendMessage)</b>
<b>SendOCU3Stats: MEM_FULL(send_data)</b> While sending OCU3 stats to client.
<b>SendOCU3Stats:MEM_FULL(OCU3_Stats_Msg)</b>
<b>SendOCU3Stats: MEM_FULL(send_basemessage)</b>
<b>SendOCU3Stats: ERROR(SendMessage)</b>
<b>SendAutoRepeatCounterExpiredToMC3Client: MEM_FULL(send_data)</b> While sending zone auto repeat info to client.
<b>SendAutoRepeatCounterExpiredToMC3Client: MEM_FULL(AutoRepeatCounterExpiredDetails)</b>
<b>SendAutoRepeatCounterExpiredToMC3Client: MEM_FULL(send_basemessage)</b>
<b>SendAutoRepeatCounterExpiredToMC3Client: Error-SendMessage</b>



### 9.2.3 OCU3 Firmware & Mercury Client Application Compatibility

OCU3/Client → Firmware ↓	1.0	1.1	1.2	1.3	1.32	1.40	1.50	1.60
1.00	N	N	Y	N	N	N	N	N
1.10	N	N	N	Y	N	N	N	N
1.20	N	N	N	Y	Y	Y	Y	Y
1.21	N	N	N	N	Y	Y	Y	Y
1.30	N	N	N	N	Y	Y*	Y*	Y*
1.31	N	N	N	N	Y	Y*	Y*	Y*
1.40	N	N	N	N	Y	Y*	Y*	Y*

(\* = OK for CLC)

### 9.2.4 OCU3 Firmware Release Features

**Release 1.0** (12/2/2010)

Features include:

- Initial release of OCU3 firmware for Master and Zone PCA.
- Basic functionality of OCU3 operator console for Mercury Remote Inking product.
- Communication for Master-to-Zone and Zone-to-Zone functionality.
- Master overlay switch control and touchscreen controls, graphical controls for touchscreen; ALL ZONES UP, ALL ZONES DOWN, LOCK, RUN, and fountain selections.
- Zone overlay switch control for ZONE UP and ZONE DOWN.
- Zone displays include position and target density values, two status icons.
- Other Master controls for surface selection, display mode selection, and Diagnostics menu.
- Master status displays for CLC active and firmware versions.
- Compatible with Mercury 1.20 or later.

**Release 1.10** (3/31/2011)

Zone Lock feature added new messages to OCU3; needs 1.30 Client or later.

**Release 1.20** (2/9/2012)

Features include:

- Upgrade Release of OCU3 firmware for Master and Zone PCA.
- Upgraded functionality of OCU3 operator console for Mercury Remote Inking product:
  - Implemented Diagnostics menu password.
  - Added Zone Lock feature for OCU3 zone controls.
  - Implemented all of the Zone status symbols.
  - Included fixes for Zone versions 1.01 and 1.02.
- Compatible with Mercury 1.30 or later.

**Release 1.21** (9/13/2013)

Features include:

- Added message **OCU3\_TO\_MC3CLIENT\_OCU3\_STATS (0x1599)** to send the internal OCU3 status data to Mercury Client, refer to section #27 for more details.
- Added command line switch **/DEBUGOCU3** on Mercury Client to enable sending internal OCU3 status data to Mercury Client. In order to enable or disable this feature the message **MC3CLIENT\_TO\_OCU3\_SUBSCRIBED = 0x1401** was modified.
- Added support for processing modified subscribed message (**0x1401**) to enable or disable sending OCU3 status data.

**Release 1.30** (6/3/2014)

Features include:

- Changes made in OCU3 Master FW codes:
  - Ignored the 'LOCK' button press if OCU3 is in Diagnostic screens / Zone Lock screen / Help (?) screen.
  - Removed inker navigation button controls and surface selection controls from Zone Lock screen.
  - Fixed losing CLC status on zone displays when console lock button is toggled.
  - Added the following bitmap images to replace existing images:



- Auto Repeat mode – In some scenarios, OCU3 Master seems to be engaged in Auto Repeat mode even after releasing the Zone All Up or Zone All Down buttons. So implemented checks to limit the Auto Repeat changes to max of 10 intervals in both modes (Zone Key display mode and Target density mode). This change would minimize the impact of Auto Repeat mode to the current inker and current mode.
- Also includes Master bug fix on 6/18/2014.

Following are known issues with these changes:

- OCU3 will send following message to Client when auto repeat counter expires:  
**(OCU3\_TO\_MC3CLIENT\_AUTO\_REPEAT\_COUNTER\_EXPIRED = 0x150F)**  
Looks like this may not help us to determine if the button was bad or operator was holding the button for long duration. However this information will be logged to the OCU3 log file.
- Since we have limited the auto repeat counter to only 10 intervals – this logic would limit the auto repeat changes to 10 intervals even in target density mode. This looks OK, but operator has to push the Zone All Up / Down button again to reach desired targets.

**Release 1.31 (8/1/2014)**

Includes Master bug fix.

**Release 1.40 (11/19/2015)**

Features include:

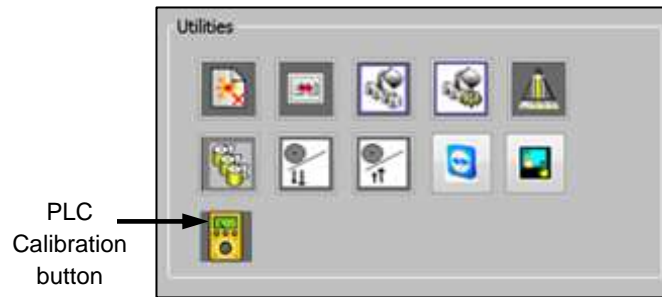
- Changed AVT logo on main display.
- Changed power-up image on zone LCD.
- Fixed Diagnostic menu password.
- Communication stability issues with Client during Dual Console operation.

## 10 Ramping PLC – Sweep Calibration

Use the steps below to perform sweep calibration for each fountain with ductor roller speed controls with potentiometer feedback and AVT PLC sweep controller installed.


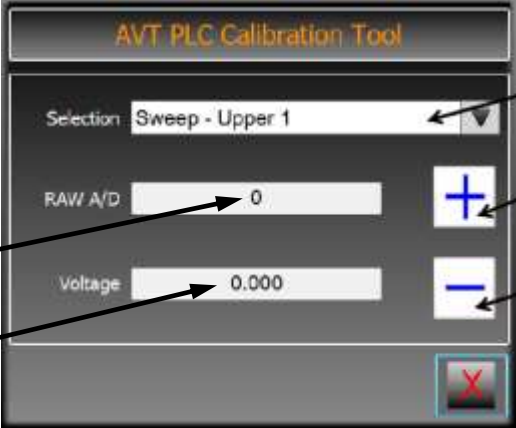

### 10.1 Accessing the PLC Calibration Tool





You access the PLC Calibration tool by touching the **System** button, **System** from the drop-down menu, and then the **PLC Calibration** button under Utilities.



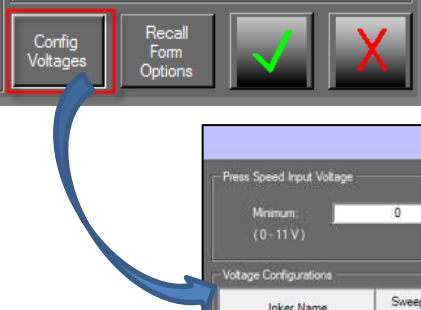
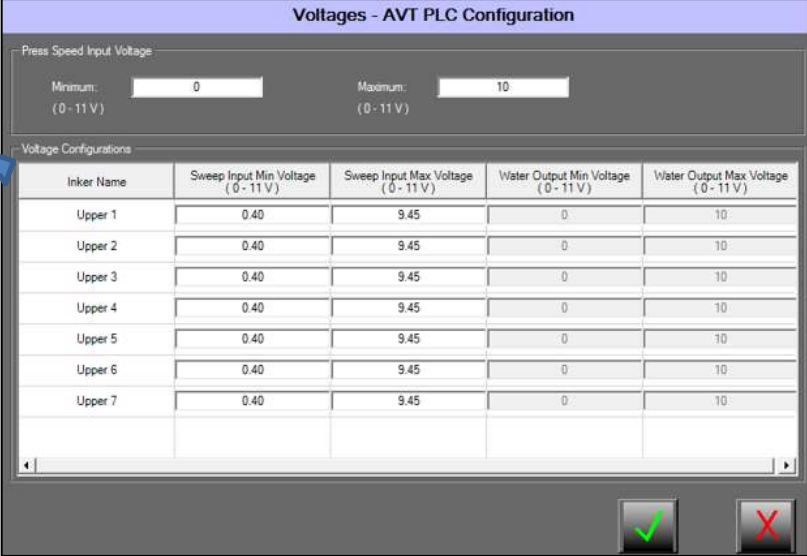




### 10.2 Calibrating Positioner Diagnostics for AVT PLC Sweep/Water Controls

**Note:** This feature is only available when AVT PLC is online and connected to the Mercury application server.

<p>1</p>	<p>Touch the <b>PLC Calibration</b> button  under Utilities.</p> <p>The AVT PLC Calibration Tool dialog displays for you to troubleshoot and calibrate the positioner feedback circuit of Sweep and Water controls.</p>  <p>Raw A/D Value</p> <p>Voltage Output</p> <p>Data Selection</p> <p>Advance Motor Position</p> <p>Retard Motor Position</p>
<p>2</p>	<p>Touch  next to <b>Selection</b>, to select a Sweep/Water inker and view its <b>Raw A/D</b> value and <b>Voltage</b> output.</p> <p>The current voltage reading of the potentiometer displays in real time, depending on the position of the potentiometer. The minimum value is 0.0 volts and the maximum value is 10.0 volts.</p>

3	<p>Touch  (<b>Advance Motor Position</b>) or  (<b>Retard Motor Position</b>) to advance or retard the <b>Voltage</b> output (Sweep / Water motor position).</p> <p>With each touch, the display controls on this tool will move the potentiometer position in the Advance or Retard direction. One touch will move the potentiometer position a small amount.</p> <p><b>Note:</b> Be sure the Advance control <u>increases</u> the voltage reading and the Retard control <u>decreases</u> the voltage reading. If not, the motor connection on the ductor roller is installed reversed and should be corrected to allow the Mercury system to control the ductor roller speed properly.</p>
4	<p>Observe any changes to the <b>Raw A/D</b> value, that will be updated at 2 second intervals if the Raw AD value changes.</p>
5	<p>Set the zero position on the speed control.</p> <p>A. Mechanically move the roller speed setting to its lowest speed.</p> <ul style="list-style-type: none"> <li>• If this a fine tune adjustment of an already functional sweep control, use the Mercury sweep control to position the sweep to zero percent. Otherwise, use the manual controls on the printing unit to set the sweep or ductor speed to its <b>LOWEST</b> point.</li> <li>• At this point, the voltage reading should be less than 1.0 volts. If not, the calibration setting on the potentiometer on the roller speed mechanics should be adjusted as low as possible.</li> <li>• Note minimum voltage reading for later recording of this fountain.</li> </ul> <p>B. Mechanically adjust the roller speed to near the maximum speed.</p> <ul style="list-style-type: none"> <li>• If this a fine tune adjustment of an already functional sweep control, use the Mercury sweep control to position THE sweep to 99 percent. Otherwise, use the manual controls on the printing unit to set the sweep or ductor speed to its <b>HIGHEST</b> point.</li> </ul> <p><b>Note:</b> The Mercury PLC potentiometer control will operate in a voltage range of 0.0 - 10.0 volts. It may not always be possible to get near 10 volts for the maximum ductor speed. It is recommended that the positioner calibration points not be set while contacting any mechanical stops.</p> <ul style="list-style-type: none"> <li>• Note maximum voltage reading for later recording of this fountain.</li> </ul>
6	<p>Repeat <b>steps 2-5</b> for the next fountain to be calibrated.</p>
7	<p>Touch  to exit the AVT PLC Calibration Tool dialog and then touch  to set the press.</p>

### 10.3 Recording PLC Calibration Values

1	Exit the Mercury <b>Client</b> application and shut down the Mercury <b>Server</b> application.
2	Start the Mercury <b>SiteGen</b> application from the desktop.
3	Load the system <b>XML file</b> and go to the <b>Sweep Interface</b> menu.
4	<p>Select <b>Configure &gt; Config Voltages</b>. The <b>Voltages – AVT PLC Configuration</b> screen displays.</p>  
5	Using a PC keyboard and mouse, enter <b>minimum and maximum voltages</b> for each calibrated fountain and then click  to complete this entry.
6	Click  again to complete the sweep configuration and then click  again to complete the sweep interface.
7	Click the <b>SAVE</b> control at the bottom right of the display to save the system configuration. When asked about overwriting the existing file, click <b>YES</b> .
	
8	Exit the SiteGen application by clicking the big <b>X</b> in the right corner.
9	Restart the Mercury Application Server and Client on the desktop.

## 10.4 Checking the Positioning of Ductor Roller Speed

For each fountain, check the positioning of the ductor roller speed mechanism.

1	Adjust the sweep value on the Mercury Client main view to <b>ZERO%</b> and click <b>RUN</b> .
2	Wait for the positioner to reach its position.
3	Adjust the sweep value on the Mercury Client main view to <b>99%</b> and click <b>RUN</b> .
4	Wait for the positioner to reach its position.
5	Replace any covers removed on the fountain.

## 11 HMI PLC Installation and Service



### 11.1 Installing the HMI PLC

1	Route the CAT5 cable to the mounting location on the press unit. The other end of the CAT5 cable should be terminated at the POE Ethernet switch near the AVT PLC.
2	Find a location on the side of the printing unit that can be used by the press crew and does not interfere with the mechanics of the printing unit cover. Attach with the mounting bracket supplied.
3	Connect the CAT5 cable to the HMI RJ45 connection at the bottom of the HMI enclosure.
4	Configure the printing number setting for each HMI installed.

### 11.2 Maintaining the HMI PLC

#### Display Cover

The plastic protective overlay of the HMI display/controls, covering the LCD display, can be damaged. This overlay can be replaced. See SN 468 for details.

#### HMI Reset

The HMI unit is powered by the CAT5 cable. Temporarily removing the CAT5 cable from the bottom of the HMI enclosure or the POE switch will reset the HMI.



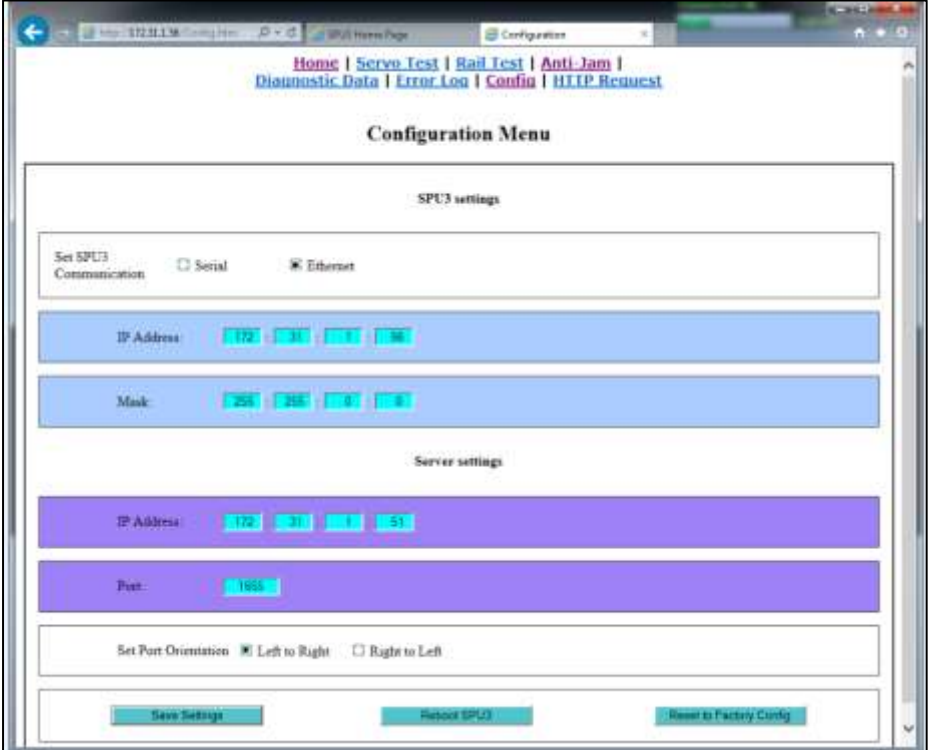
## 12 SPU3 Ethernet

### 12.1 Mounting the SPU3

Mount the SPU3 in the same manner as the SPU2 or SPU3 serial units.

The only difference is the serial cable from the Mercury App Server is no longer required and the CAT5 cable routed to the Ethernet switch near the Mercury App Server is required.

### 12.2 Configuring the SPU3

1	See the <i>Ethernet Install Guide – Windows Clients &amp; Servers</i> (P/N 090S900075) for detailed information on IP address guidelines.
2	Set the SPU3 configuration screen to Ethernet communications and configure the Mercury App Server IP address to match the Mercury system controlling this press.
3	Use the SPU3 Auto IP Configuration to aid in correcting the SPU3 IP address setting to the system .XML settings. See SN480 for details. 

## Appendix A: Mercury Computers Folder Organization

Starting with the Mercury 1.20e software release, the Mercury folder organization has been modified.

### Introduction to the Deep Freeze File Protection Utility

To keep files in the Mercury computer operating in a stable environment, the file protection utility called Deep Freeze has been utilized in the Mercury System. This utility allows the critical files of the Mercury system to be protected from any changes.

The hard drive with the Windows operating system and the Mercury application is protected from any permanent changes. Changes can be made to allow the system to function properly, but any files changed will be restored on the next system reset.

There is a new drive D partition on the Mercury system which is not protected and allows user configuration and form storage to be kept on the local hard drive. All customer data files will be stored on this drive.

### Addition of UPS (Battery Backup)

To allow the Mercury system to have a controlled shutdown of the Windows computer, a battery backup device is being supplied with the Mercury system. This device will allow a controlled shutdown of the computer in the event of a power interruption. The computer will remain powered until the power is restored or the battery storage reaches a certain level and must shut down the operating system and applications.

To use the Deep Freeze utility, refer to Service Note 422 which explains the details of modifying the files on the protected drive C for Mercury field configuration. It is important that this document be reviewed to understand how any permanent change to the Mercury system is to be configured.

To further understand the details of the Mercury system configuration, refer to the *Mercury Site File Generator User's Manual*. This manual explains how to change any of the folder configurations used in the Mercury software system, as well as the operational configuration of the Mercury system.

## Current Mercury Disk Storage Maps

The following figure shows the Drive C overall map.

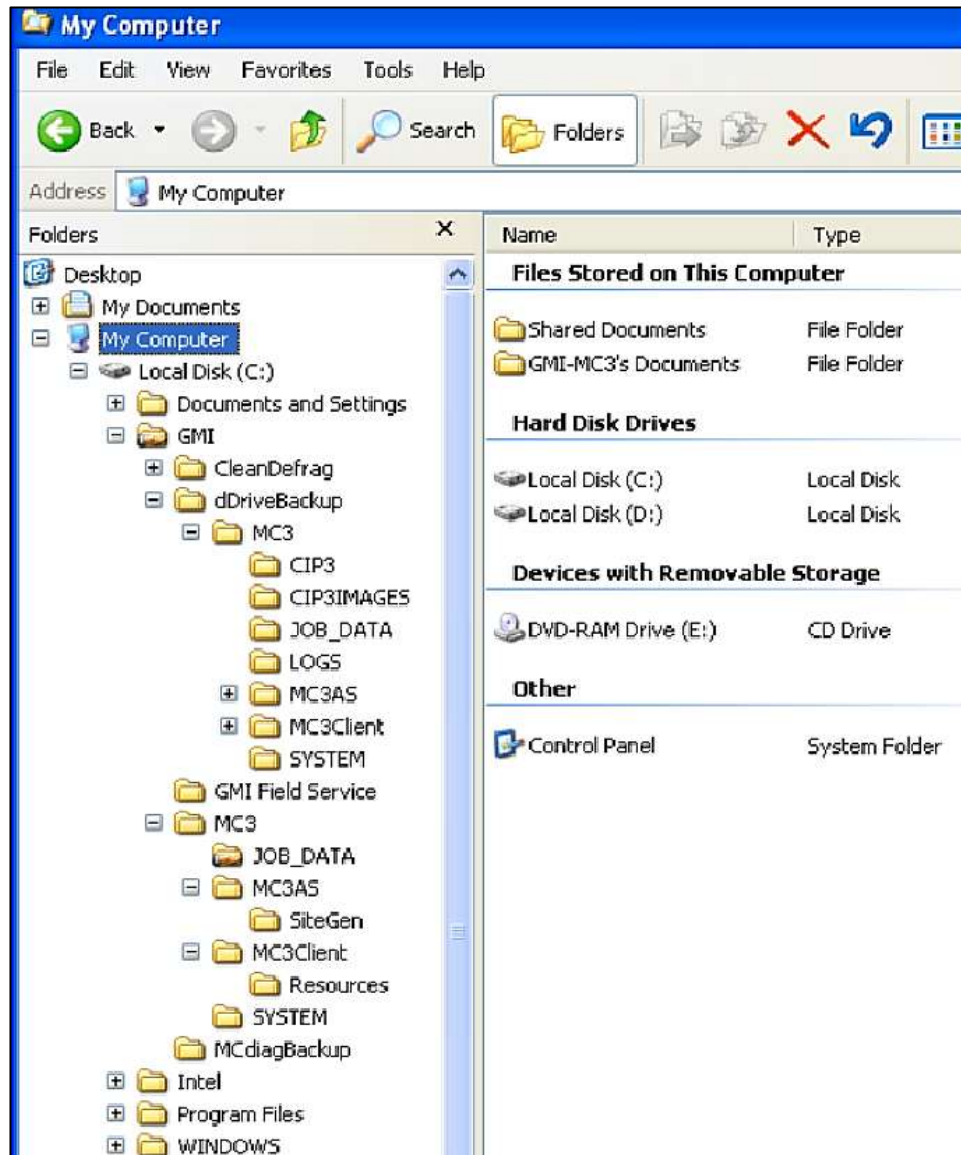


Figure A.1: Drive C Overall Map

The following figure shows the Drive D overall map.

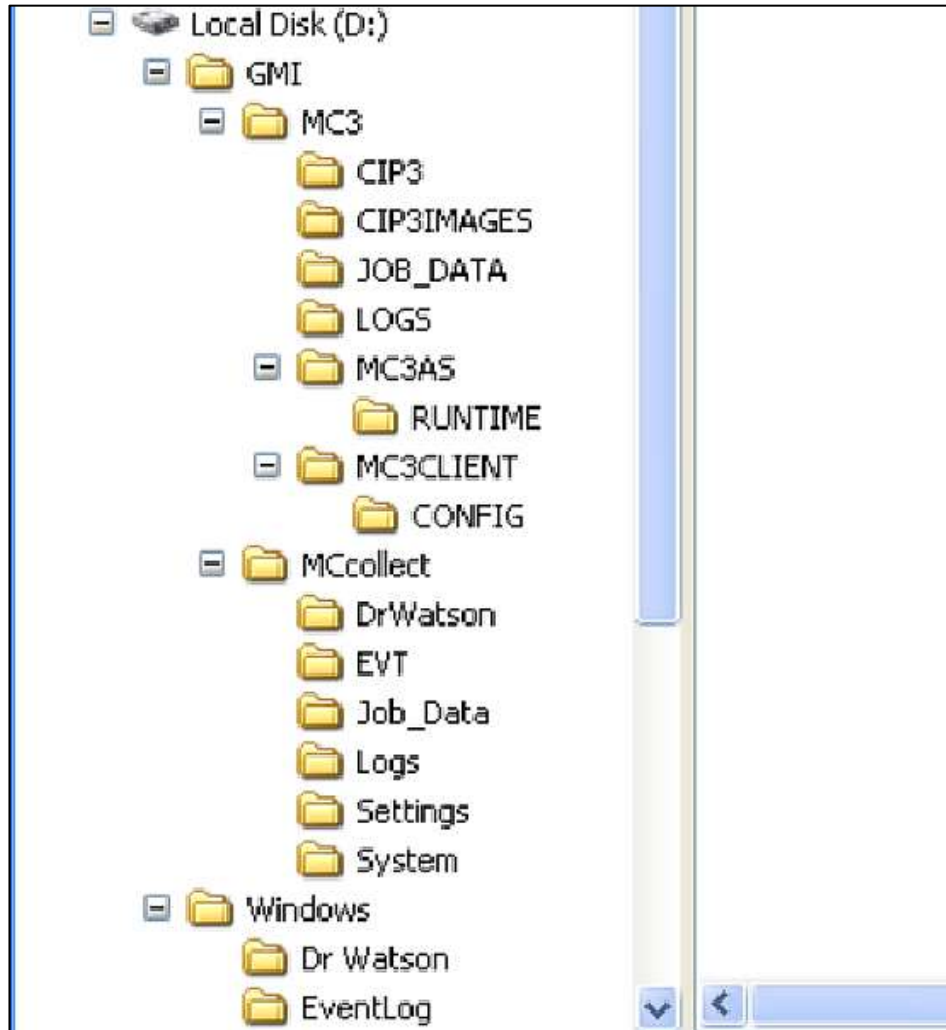


Figure A.2: Drive D Overall Map

### Critical File Locations

C:\GMI\MC3\MC3AS	Contains Mercury App Server executables and configuration files. The folder must contain the file MCApServer.mcpath.
C:\GMI\MC3\MC3Client	Contains the Mercury Client executables and language files. This folder must contain the file MCClient.mcpath.
C:\GMI\MC3\SYSTEM	Contains main Mercury configuration file. This file defines the Mercury interfaces to the press. This file is called MCxxxx.XML.
D:\GMI\MC3\JOB_DATA	Contains local form storage of the Mercury system. It has a share of <b>MC3_JOB_DATA</b> for remote clients.
D:\GMI\MC3\MC3AS\RUNTIME	Contains Mercury runtime configuration files.
D:\GMI\MC3\MC3Client\CONFIG	Contains Mercury GUI runtime settings.

### Details on the Mercury System Folders

C:\GMI\MC3\JOB_DATA	This folder does NOT contain any form data. It is always empty.
C:\GMI\MC3\MC3AS	<p>Contains the:</p> <ul style="list-style-type: none"> <li>• Mercury App Server executables (MC3AppServer.exe),</li> <li>• Fountain servo turns files (XLIN*.*)</li> <li>• License file (GMIMC3License.lic)</li> <li>• App Server folder locations file (MCApServer.mcpath)</li> <li>• XML editor application</li> </ul> <p>The license file is created at the AVT factory.</p> <p>The folder location file contains four file locations paths:</p> <ul style="list-style-type: none"> <li>• System - points to system configuration file.</li> <li>• Data - points to local storage folder.</li> <li>• Log - points to Mercury system logging folder.</li> <li>• System Runtime - points to runtime .XML folder.</li> </ul>

C:\GMI\MC3\MC3AS\SiteGen	Contains the Mercury System File Generator application. There are two files: MCNWSiteGen.exe and MC3ListView.dll.
C:\GMI\MC3\MC3Client	Contains the Mercury Client executables (MC3Client.exe, AutoScanCal.dll), and the Client folder locations file (MCClient.mcpath). The license file is created at the AVT factory.  The folder location file contains just one file location, MCClient Active Options path, which points to file that holds GUI optional settings.  The folder location file is edited by the Mercury SiteGen application.
C:\GMI\MC3\MC3Client\Resources	This folder contains all of the available language text files which are available to the Mercury software application. These files begin with the name resources.  English is the default language file.
C:\GMI\MC3\SYSTEM	This folder contains the Mercury system configuration file, MCxxxx.XML. The xxxx is the system number.  This file is edited by the Mercury SiteGen application.
D:\GMI\MC3\CIP3	This folder is normally empty on a standard production system, as the normal folder location for CIP3 presetting files is on another file server.  This folder can be used for sample CIP3 files and for demonstration purposes.
D:\GMI\MC3\CIP3Images	This folder is normally empty on a standard production system, as the normal folder location for CIP3 presetting files is on another file server.  This folder can be used for sample CIP3 files and for demonstration purposes.

D:\GMI\MC3\JOB_DATA	<p>This folder contains the files for Mercury form storage. These .XML files contain all of the parameters used in recalling a set of fountain profiles for any saved form. It may contain user created folders to organize form data.</p> <p>Be aware that every version of the same form is stored in a single .XML file. At this time there is no way to delete a specific version of the stored form.</p> <p><b>NOTE:</b> This folder must be shared as <b>MC3_JOB_DATA</b> with full access to everyone. Otherwise, this may cause issues while saving to Standard Form Storage and also when a form is recalled from a remote Client.</p>
D:\GMI\MC3\LOGS	<p>This folder contains the current logging of the Mercury system.</p> <p>There are files for recording the various levels of Mercury operations.</p>
D:\GMI\MC3\MC3CLIENT\CONFIG	<p>This folder contains the Mercury GUI optional parameters file, MC3ActiveOptions.XML.</p>
D:\GMI\MC3\MC3AS\RUNTIME	<p>This folder contains the customer configured parameters of the Mercury system and the active status of the Mercury system:</p> <p><b>MCACTIVESTATUS</b> - Contains the current form data, each fountain's on-press value, console value, sweep and water values.</p> <p><b>MCUSERCONFIG.XML</b> - Temporary storage of data, created on App Server startup with data from System Configuration data. Includes site name and system number, press count, press name, default color order count, and default color order - ink name types.</p> <p><b>MCSCANCALIBRATION.XML</b> - CIP3 presetting correction curves for each paper type. There are 18 correction points for each paper type.</p> <p><b>MCINKLIBRARY</b> - Ink library storage of each available ink color and its on-screen display parameters. Stored in order of entry.</p> <p><b>MCSERVOFFSETTABLE.XML</b> - Contains the fountain offsets for metering roll presses.</p>

## Details on the Mercury Support Folders

C:\GMI\CleanDefrag	Contains the applications and scripts to clean up and defragment the Windows system.
C:\GMI\dDriveBackup folders	<p>Contains default file images of the working runtime files used on drive D. These files can be used to repair damaged files located in the drive D folders.</p> <p>At this time, only the MCACTIVESTATUS and MCUSERCONFIG files are replaced using the Restore Mercury Defaults tool.</p>
C:\GMI\GMI Field Service	<p>Contains various tools used by GMI CS FSEs. This includes the Restore Mercury Defaults script, which repairs the active status files of the Mercury system, if the Mercury system cannot be started up correctly.</p> <p>This tool is manually invoked by the operator or CS remotely.</p>
C:\GMI\MCdiagBackup	<p>Contains applications and scripts to perform a daily backup of certain Mercury system runtime files.</p> <p>These backups only include the files which changed for that day.</p>
D:\GMI\MCcollect folders	Contains the backup files for Mercury diagnostics.
D:\Windows\Dr Watson	Contains the latest Dr. Watson files from unintended Mercury application interruptions (program crashes).
D:\Windows\EventLogs	Contains the Windows Event Logs. Use the Windows Event Viewer to view the event entries.



## System Configuration Modification Guidelines

Before editing the system configuration .XML with SiteGen, the application server and client must be closed. If the system configuration .XML is edited on a Mercury system, it is best to remove some of the RUNTIME files before starting the application server again.

MCACTIVESTATUS.XML	It is always OK to remove this file before starting again.
MCUSERCONFIG.XML	It is always OK to remove this file before starting again.
MCSCANCALIBRATION.XML	<p>This file can remain unchanged over many types of changes in the Mercury system. It is best to keep this information for future presets of this press. It is not wise to move this file to another press.</p> <p>The MCII data from the CIP3 presetting may be input directly, in the case of an upgrade.</p>
MCINKLIBRARY	<p>This file can remain unchanged over many types of changes in the Mercury system. It is best to keep this information for future forms.</p> <p>This file can be moved or copied from another system.</p>
MCSERVOOFFSETTABLE.XML	<p>Contains the fountain offsets for metering roll presses.</p> <p>You must keep this file intact, as it contains key offset data which is important to the calibration of each fountain. If the number of zones or units on the press changes, this file may need to be updated.</p>

Many of the parameters in the SiteGen application are the same as the Microcolor II SiteSet utility.

# Appendix B: Declaration of Conformity



## EC Declaration of Conformity

**Company Name and Address:**

AVT (Advanced Vision Technology)  
10460 Miller Road  
Dallas, TX 75238 USA

**Name and address of the company authorized to compile the Technical File:**

AVT (Germany) GMBH  
32 Donnersbergerstrasse  
Munich P0634 Germany  
Tel: + 49 - 89 - 216 - 68-079  
Fax: + 49 - 89 - 216 - 68 - 166

**AVT declares under our sole responsibility that the product described as:**

Equipment Name: Mercury  
Generic Equipment Description: Remote Ink Control System for Printing Industry  
Model/Type:  
Serial number(s): 7168 - 99999

**Complies with the requirements of the following European Directives:**

2006/42/EC	Machinery Directive
2004/108/EC	Electromagnetic Compatibility Directive

**Main standards considered:**

EN ISO 12100:2010,  
EN 60204-1:2006 +A1:2009, EN ISO 13849-1:2008,  
EN 61000-6-2:2005, EN 61000-6-4:2007 +A1:2011

**AVT Technical File Document Number:** 500G300068

**Date:** 8/11/2015 **At:** AVT Dallas TX USA

**Name of Authorized company representative:** Alan Then

**Signature:**   
Alan Then, General Manager, AVT-Dallas TX USA

500G100196 Rev. A

# Revision History

## Version 1.7

Revision Date	Revised By	Version	Section/Page Numbers	Revision Description
10/21/2020	SW	1.7	All	<ul style="list-style-type: none"> <li>Initial release of V1.7. Updated screen shots, as needed.</li> <li>Removed Deep Freeze password (section 6.2).</li> <li>Added new section 10 on “Ramping PLC Features”, section 11 on “HMI PLC Installation and Service”, and section 12 on “SPU3 Ethernet”.</li> </ul>

## Version 1.6

Revision Date	Revised By	Version (EO)	Section/Page Numbers	Revision Description
11/22/2017	SW	1.6 (17323)	All	<ul style="list-style-type: none"> <li>Initial release of V1.6. Updated all screen shots.</li> <li>Converted version 1.2 from FrameMaker to Word.</li> <li>Incorporated updates for V1.32, V1.40, and V1.50.</li> <li>Added markers for Client to use to find appropriate section in Service Manual file for Servo Test, SPU Test, Auto Test, and Sweep Test.</li> <li>Added new section on OCU3 System Configuration and Service (moved from OCU3 User Manual).</li> </ul>
4/2/2018	SW	1.6B (#####)		<ul style="list-style-type: none"> <li>Added new appendix to include “Declaration of Conformity”.</li> <li>Added new section 2.1 to include “Mercury System Installation”.</li> </ul>

### Versions 1.0 – 1.5

Revision Date	Revised By	Version (EO)	Section/Page Numbers	Revision Description
1/20/2009	KN / SW	1.0	All	Initial release.
1/5/2010	SW	1.1	All	Updates for Mercury 1.1. (Changed product name to Mercury.)
1/12/2010	SW	1.2A (15448)	All	Added CLC install, OCU3 install, wide press configuration, and multi-client configuration.
4/8/2010	SW / DS	1.2A (15448)	All	Updates for Mercury 1.20.
8/18/2010	SW	1.2B (15660)	Section 5	Added new sections on “Troubleshooting System Startup” and “Changing System Configuration in the Field”.
8/23/2010	SW	1.2B (15660)	Appendix A	Added new appendix called “Mercury Computers Folder Organization”.
10/7/2010	SW	1.2C (15713)	Section 7	Added new section called “OCU3 Touch Calibration”. This section was moved here from the OCU3 User Manual.
4/3/2015	SL	1.2D (16630)	Front only	Updated for address and logo.
1/11/2016	DG	1.2E (16841)	Pages 3 & 10	Corrected RS-422 Connection details.