

ELEMENTAL SCIENTIFIC



# oneFAST

Installation and Software Guide

oneFAST

## Installation and Software Guide

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## **Introduction**

The oneFAST system by Elemental Scientific, Inc. provides some of the same FAST features found on the SC autosamplers such as high throughput and fast washout but extends these features to non-ESI autosamplers.

Integration with an SC Autosampler will provide the full set of FAST features; however, depending on the autosampler used, some features may not be available.

## **Description**

The oneFAST system can be integrated with an existing instrument (host software), so the user will be able to employ the use of a “quick loading sample valve”, (FAST Valve) to reduce sample uptake and rinse times.

If additional features are required, the user may elect to incorporate the use of an SC Autosampler with the oneFAST components.

## **Requirements**

Operating Systems: Windows 2000, Windows XP

Computer Disk Space: 50MB

Computer Memory: 512MB minimum depending on OS.

Serial Ports: One additional serial port (USB or DB9), required for most applications. Two ports are required if a GPIB interface is required (e.g. PE Elan).

Supporting Software: Microsoft Excel

Supported Configurations: See the section; [Hardware Installation](#) for a complete listing.

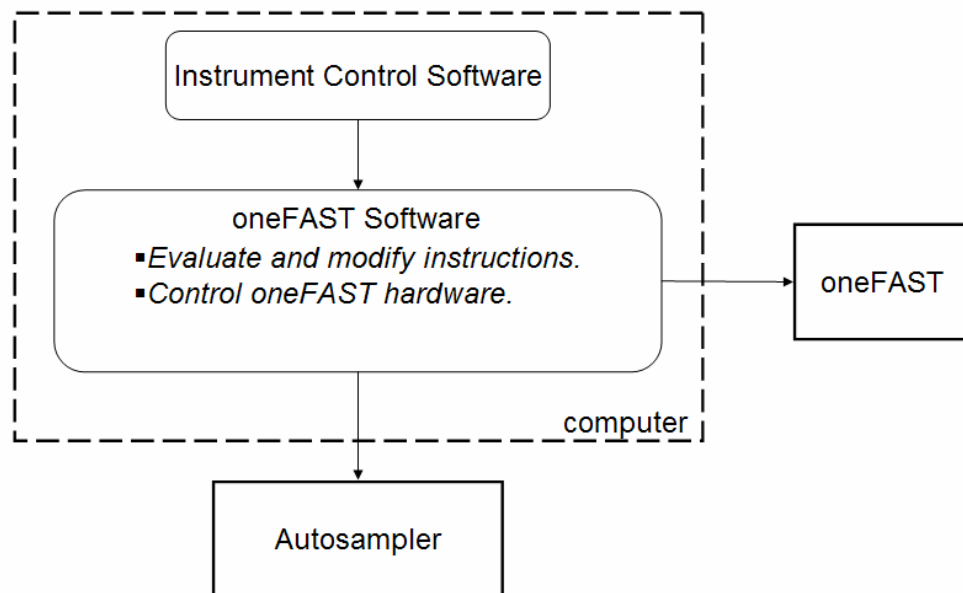
## **How It Works**

The oneFAST system works actively to control both the oneFAST hardware the autosampler device. Please refer to Figure 1: Basic Control Diagram of oneFAST. This illustration identifies the oneFAST software as the mediator between the Instrument Control Software (host software), the autosampler and the oneFAST hardware. The oneFAST hardware consists of a sample loop, a 6-port valve and a vacuum pump for rapid transport of sample. Please refer to section [Hardware Installation](#) for a description of the supported instrument and autosampler configurations.

The oneFAST software interface provides the user the freedom to work on method development quickly as no firmware or programming updates are required for the oneFAST devices. Therefore, changes to the oneFAST method can be made during the execution of an analysis sequence without hesitation. There is no need to pause or stop an analysis sequence to fine-tune FAST method times.

Additionally, the oneFAST system can provide the user with some additional flexibility depending on the host software and autosampler used. These additional features may include:

- The ability to mix rack types where previously the host & autosampler configuration was limited to a fixed layout of rack types. For instance, a limited selection of tray files may have required that all racks be of the same type; all 21-position racks or all 60-position racks.
- MoveNext feature will advance the probe above the next sequential sample to reduce autosampler movement time.



**Figure 1: Basic Control Diagram of oneFAST.**

## Getting Started

### Software Installation

Install the ESI oneFAST software using the CD provided with the system. This should be done while logged in with Administrator Privileges. The Installer will automatically start and provide instructions during the installation. If the Installer does not begin automatically, open Windows Explorer, navigate to the CD and double-click on the file Setup.exe to begin installation. Be aware that during the start of the install, periods of apparent inactivity may occur while the installer determines the computer's configuration. Please wait while this process takes place. A reboot of the computer will be required at the end of the software installation.



During first run of the oneFAST software the user may be asked to Register/License the software.

### Hardware Installation

Please locate the required hardware installation steps as required by your system. Please note that your host software, which controls the instrument, may have more than one type of connection option.

## Perkin Elmer Elan and AS-93+ (via GPIB)

The oneFAST system should be connected as shown in the attached Figure 2.

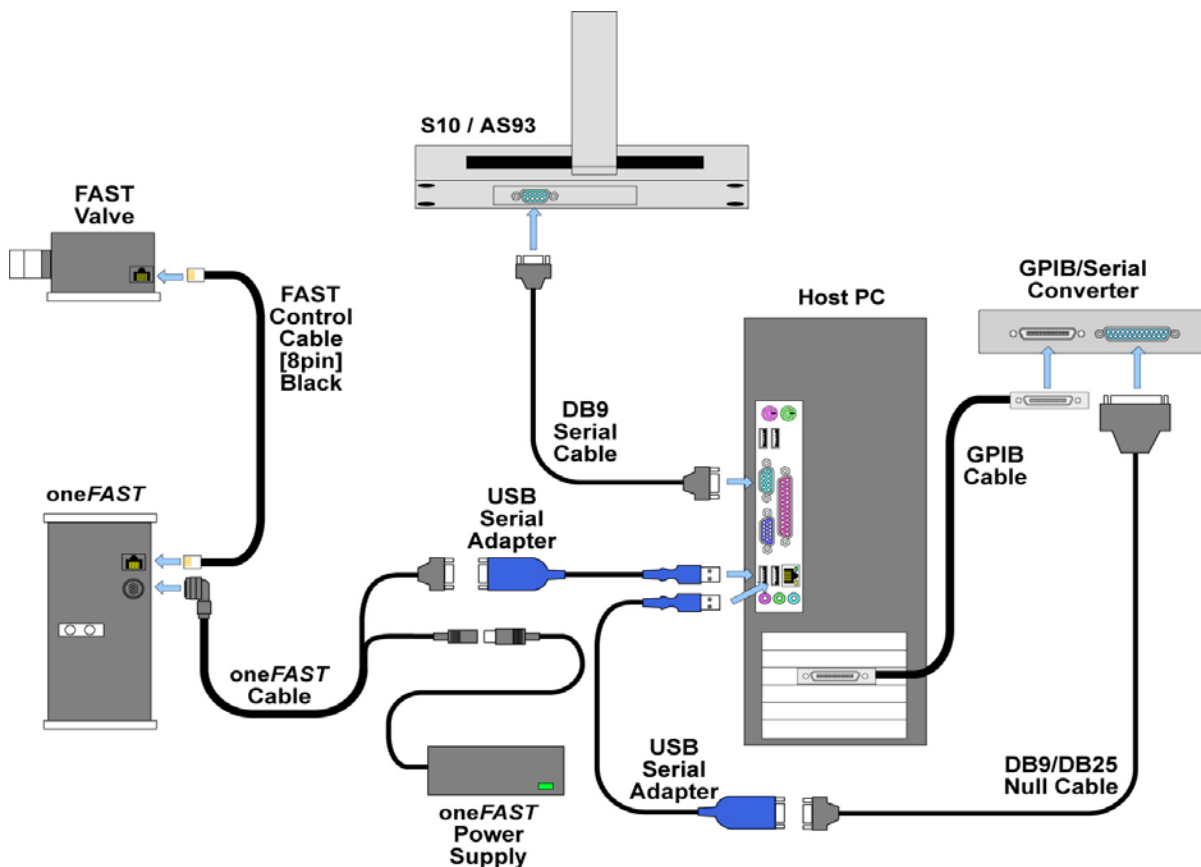



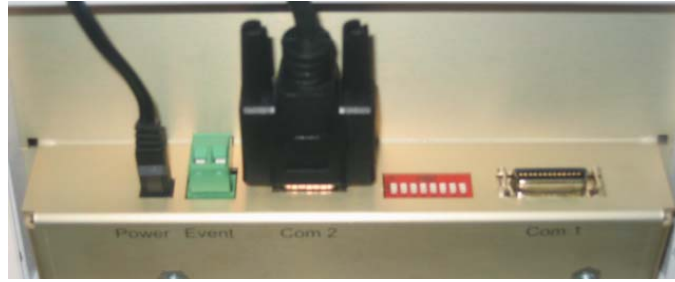
Figure 2: Connections for oneFAST with Elan and S10/AS93.

### Hardware installation procedure:

- 1) Verify that the host computer has proper control of the autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions.
- 2) Install oneFAST software as described in “Software Installation” section.
- 3) Disconnect and remove GPIB cable between AS-93+ and GPIB controller.
- 4) Connect one DB9 Serial Cable (SC-0904) between the AS-93+ and the computer. See Figure 3

 If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 5) Change all DIP switch settings to OFF. The switch is shown in Figure 3.



**Figure 3: AS-93+ Connections & Switch.**

- 6) Connect GPIB Interface (SC-0901-14) to GPIB bus using IEEE-Cable (SC-0902).
- 7) Connect GPIB Interface to computer using a USB-Serial Adapter (SC-0905) and DB25/DB9 Null Cable (SC-0903).
- 8) Place the FAST valve as close as possible to the instrument's nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005) to connect the valve to the oneFAST controller.
- 9) Connect the oneFAST controller to the computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).
- 10) Connect the oneFAST controller to the power supply (SC-0210) using the oneFAST cable.
- 11) Power-ON all devices and start the oneFAST software.
- 12) In the oneFAST software, open the "Ports" menu.
- 13) Verify that the correct autosampler and instrument were automatically detected. If the autosampler or instrument names require modification, select the appropriate ones from the drop-down box; followed by clicking the red "Click to reconfigure" bar.
- 14) Select "RS-232 Physical", set the Port to one of the available choices and then click the red "Click to reconfigure" bar.
- 15) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 16) Configure with appropriate trays by clicking on locations in autosampler image.
- 17) Start the Elan software and select correct tray file using **Devices>>Autosampler>>Browse**. Select the shortcut named "oneFAST Elan Tray File" or manually select the file at the following path: "C:\program files\esi\oneFAST\Support Files\Tray Files\oneFAST.try"



If Elan is older than version 3.4 the autosampler selection is located at

**Method>>Sampling>>Select...>>Autosampler Type**

- 18) Finally, press the "**Initialize**" button in the Elan software.



After any reconfiguration of the rack layouts in the oneFAST software, this initialization in the Elan software will also be required.

## Perkin Elmer Elan and ASX-5xx (via GPIB)

The oneFAST system should be connected as shown in the attached Figure 4.

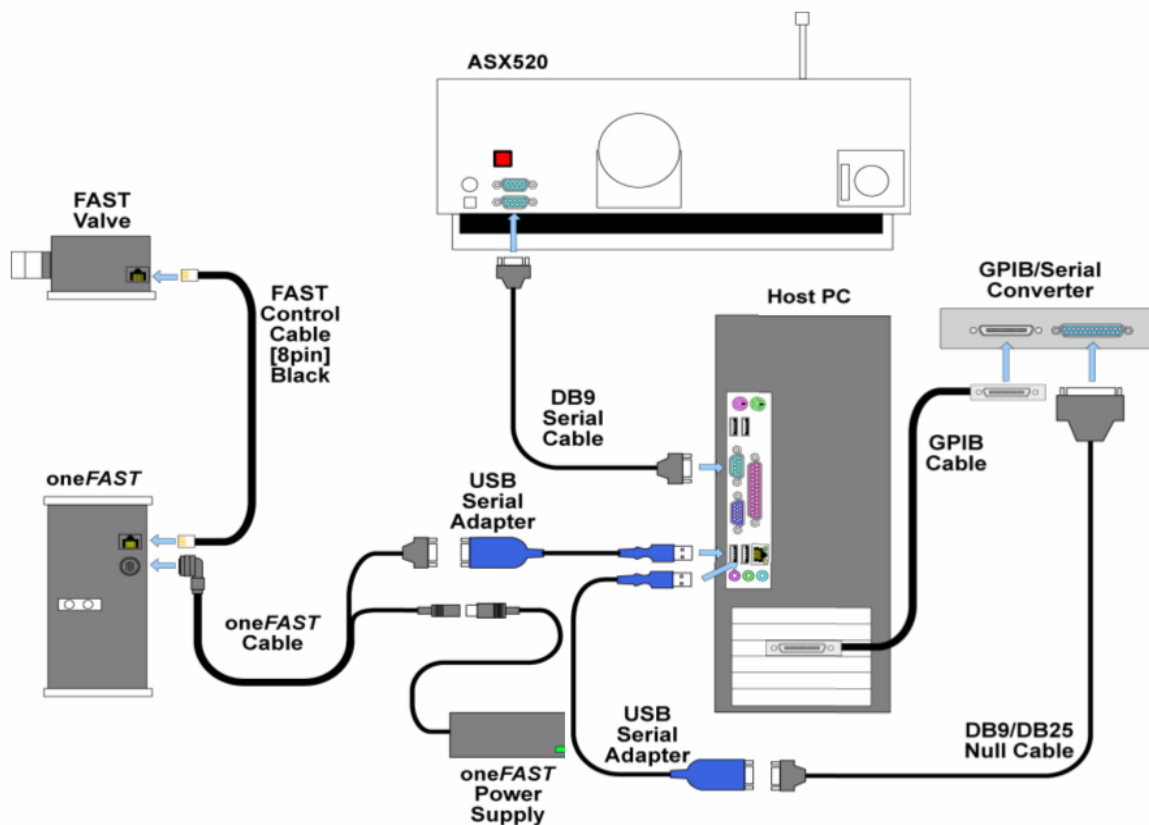




Figure 4: Connections for oneFAST with Elan and ASX-5xx.

### Hardware installation procedure:

- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions.
- 2) Install oneFAST software as described in “Software Installation” section.
- 3) Locate the serial cable between ASX-5xx and GPIB Interface (NI GPIB-232CV-A). Disconnect the end at the GPIB-232CV-A and reconnect to an available serial port on the computer.

 If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

 Please refer to Technical Note (TN010608) if the GPIB interface is an ICS 4894.

- 4) Connect GPIB Interface to computer using a USB-Serial Adapter (SC-0905) and DB25/DB9 Null Cable (SC-0903).

- 5) Place the FAST valve as close as possible to the instrument's nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.
- 6) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).
- 7) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.
- 8) Power-ON all devices and start the oneFAST software.
- 9) In the oneFAST software, open the "Ports" menu.
- 10) Verify that the correct autosampler and instrument were automatically detected. If the autosampler name or instrument name require modification, select the appropriate names from the drop-down box and follow by clicking the red "Click to reconfigure" bar.
- 11) Select "RS-232 Physical" and set the Port to one of the available choices and click the red "Click to reconfigure" bar.
- 12) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 13) Configure with appropriate trays by clicking on locations in autosampler image.
- 14) Start the Elan software and select correct tray file using **Devices>>Autosampler>>Browse**. Select the shortcut named "oneFAST Elan Tray File" or manually select the file at the following path: "C:\program files\esi\oneFAST\Support Files\Tray Files\oneFAST.try"



If Elan is older than version 3.4 the autosampler selection is located at

**Method>>Sampling>>Select...>>Autosampler Type**

- 15) Finally, press the "**Initialize**" button in the Elan software.



After any reconfiguration of the rack layouts in the oneFAST software, this initialization in the Elan software will also be required.

## Perkin Elmer Elan and S-10 (via GPIB)

The oneFAST system should be connected as in shown in the attached Figure 5.

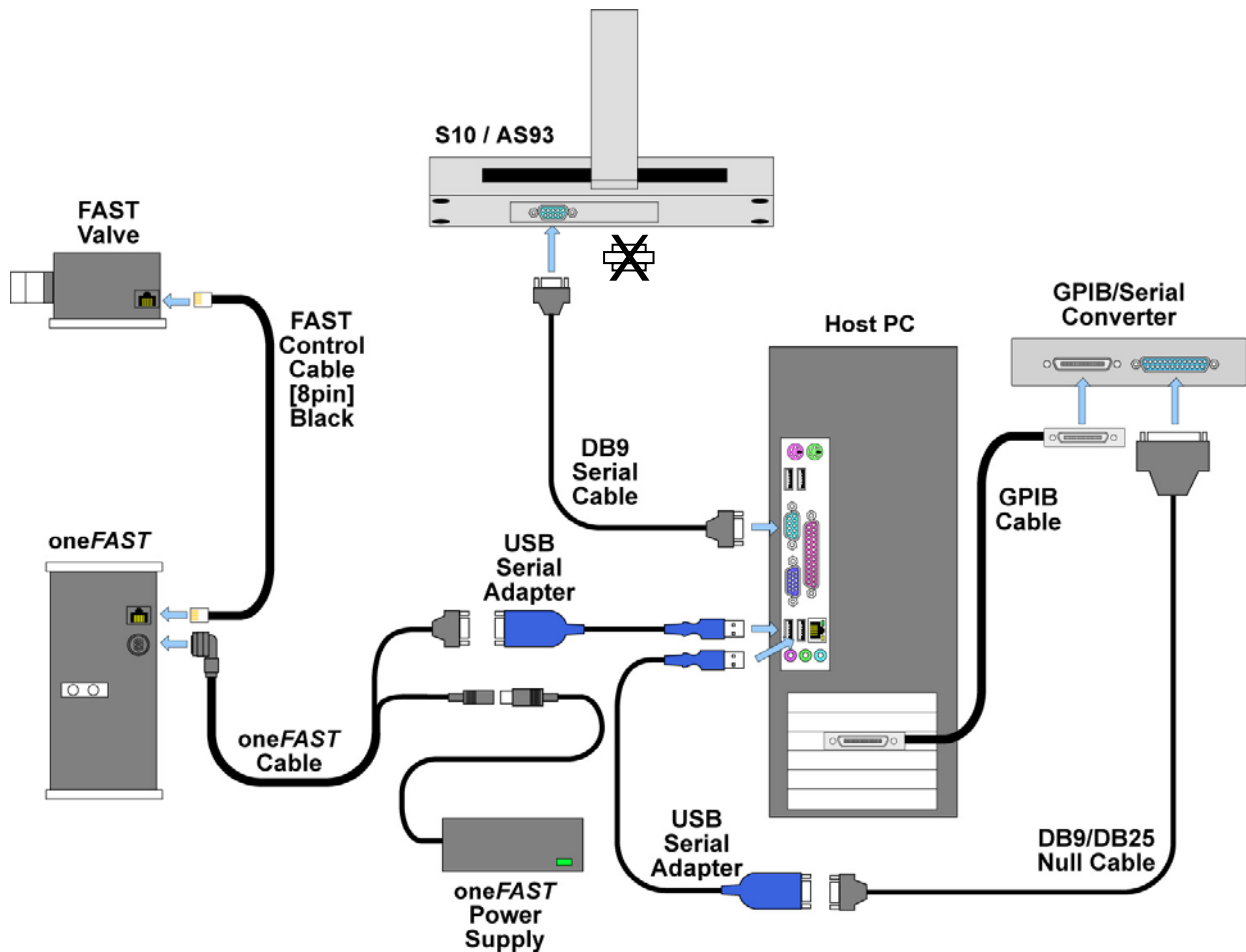


Figure 5: Connections for oneFAST with Elan and S10/AS93.

### Hardware installation procedure:

- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions.
- 2) Install oneFAST software as described in “Software Installation” section.
- 3) Remove serial cable between S-10 and GPIB Interface (SC-0901-14). Also remove any null adapter that may present.



Please refer to Technical Note (TN290508) if the GPIB interface is a NI GPIB-232-CV-A.

- 4) Connect GPIB Interface to computer using a USB-Serial Adapter (SC-0905) and DB25/DB9 Null Cable (SC-0903).
- 5) Connect one DB9 Serial Cable (SC-0904) between the S-10 and the computer.



If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 6) Place the FAST valve as close as possible to the instrument's nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.
- 7) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).
- 8) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.
- 9) Power-ON all devices and start the oneFAST software.
- 10) In the oneFAST software, open the "Ports" menu.
- 11) Verify that the correct autosampler and instrument were automatically detected. If the autosampler name or instrument name require modification, select the appropriate names from the drop-down box and follow by clicking the red "Click to reconfigure" bar.
- 12) Select "RS-232 Physical" and set the Port to one of the available choices and click the red "Click to reconfigure" bar.
- 13) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 14) Configure with appropriate trays by clicking on locations in autosampler image.
- 15) Start the Elan software and select correct tray file using **Devices>>Autosampler>>Browse**. Select the shortcut named "oneFAST Elan Tray File" or manually select the file at the following path: "C:\program files\esi\oneFAST\Support Files\Tray Files\oneFAST.try"



If Elan is older than version 3.4 the autosampler selection is located at **Method>>Sampling>>Select...>>Autosampler Type**

- 16) Finally, press the "**Initialize**" button in the Elan software.



After any reconfiguration of the rack layouts in the oneFAST software, this initialization in the Elan software will also be required.

## Perkin Elmer WinLab32 Version 3.4 and AS-93+ (via VSP)

The oneFAST system should be connected as shown in the attached Figure 6.

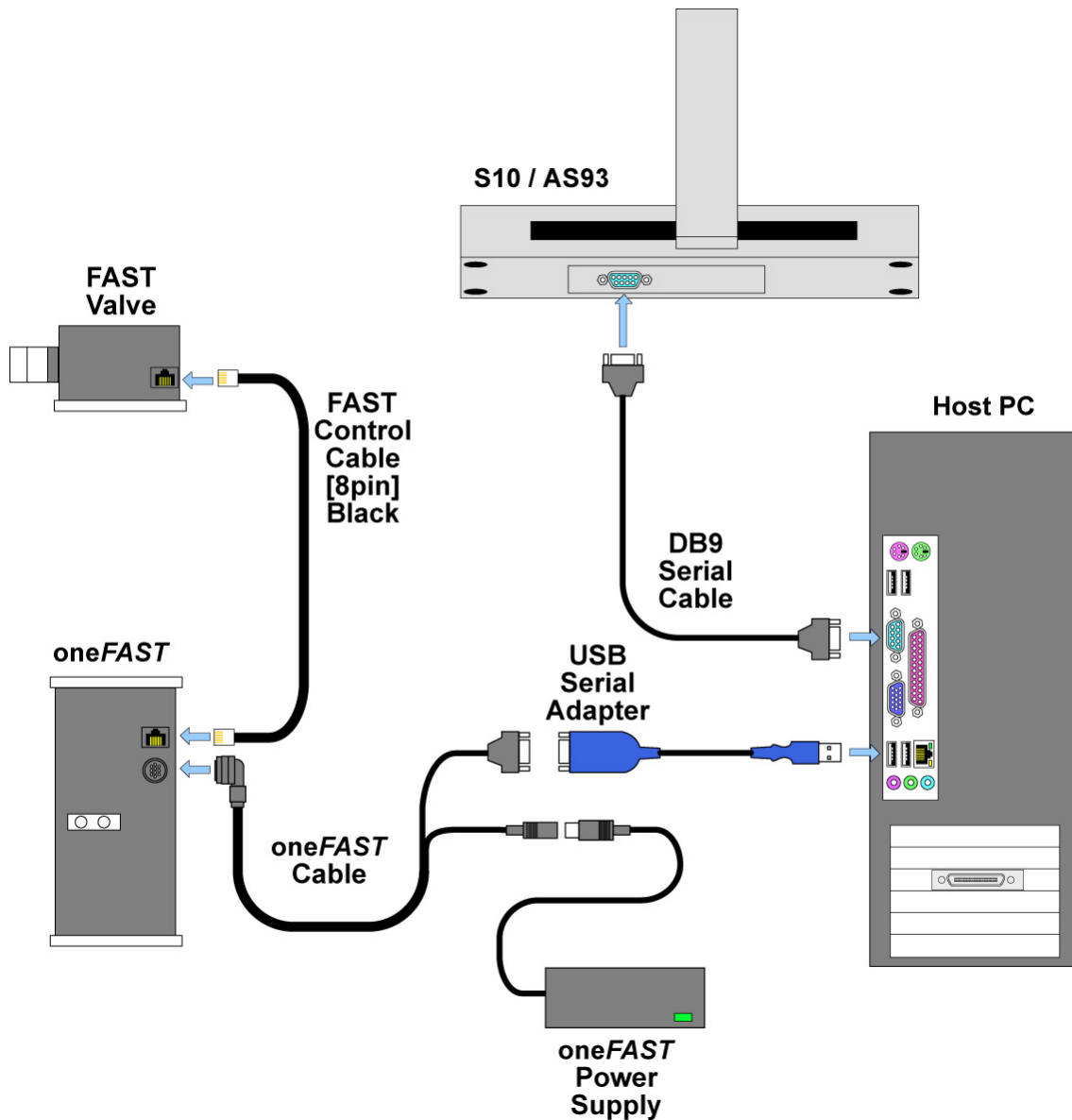


Figure 6: Connections for oneFAST with Optima and S10/AS93.

### Hardware installation procedure:

- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions.
- 2) Install oneFAST software as described in “Software Installation” section. A reboot will be required.
- 3) Disconnect and remove GPIB cable between AS-93+ and GPIB bus/controller.
- 4) Connect one DB9 Serial Cable (SC-0904) between the AS-93+ and the computer. See Figure 7.



If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 5) Change all DIP switch settings to OFF. The switch is shown in Figure 7.



**Figure 7: AS-93+ Connections & Switch.**

- 6) Place the FAST valve as close as possible to the instrument's nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.
- 7) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).
- 8) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.
- 9) Power-ON all devices and start the oneFAST software.
- 10) In the oneFAST software, open the "Ports" menu.
- 11) Verify that the correct autosampler and instrument were automatically detected. If the autosampler name or instrument name require modification, select the appropriate names from the drop-down box and follow by clicking the red "Click to reconfigure" bar.
- 12) Select "RS-232 Virtual", set the "Virtual Port" as **6** and click the red "Click to reconfigure" bar.



If port 6 is not available choose the next lowest port number.

- 13) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 14) Configure with appropriate trays by clicking on locations in autosampler image.
- 15) Run "Reconfigure" from the "Perkin Elmer WinLab32" Program Group.
- 16) Proceed to "Select autosampler model" and choose "AS-93 plus" and click Next>.
- 17) Select the interface as Serial (RS-232) and click Next>.
- 18) Select the same COM port number as the "Virtual Port"; then continue through to "WinLab32 Configuration Complete."
- 19) Start WinLab32 and select correct tray file using **Options>>Autosampler>>Browse**. Select the shortcut named "oneFAST AS93 Tray" or manually select the file at the following path: "C:\program files\esi\oneFAST\Support Files\Tray Files\oneFAST.AS93Tray"

## Perkin Elmer WinLab32 Version 3.4 and ASX-5xx (via VSP)

The oneFAST system should be connected as shown in the attached Figure 8.

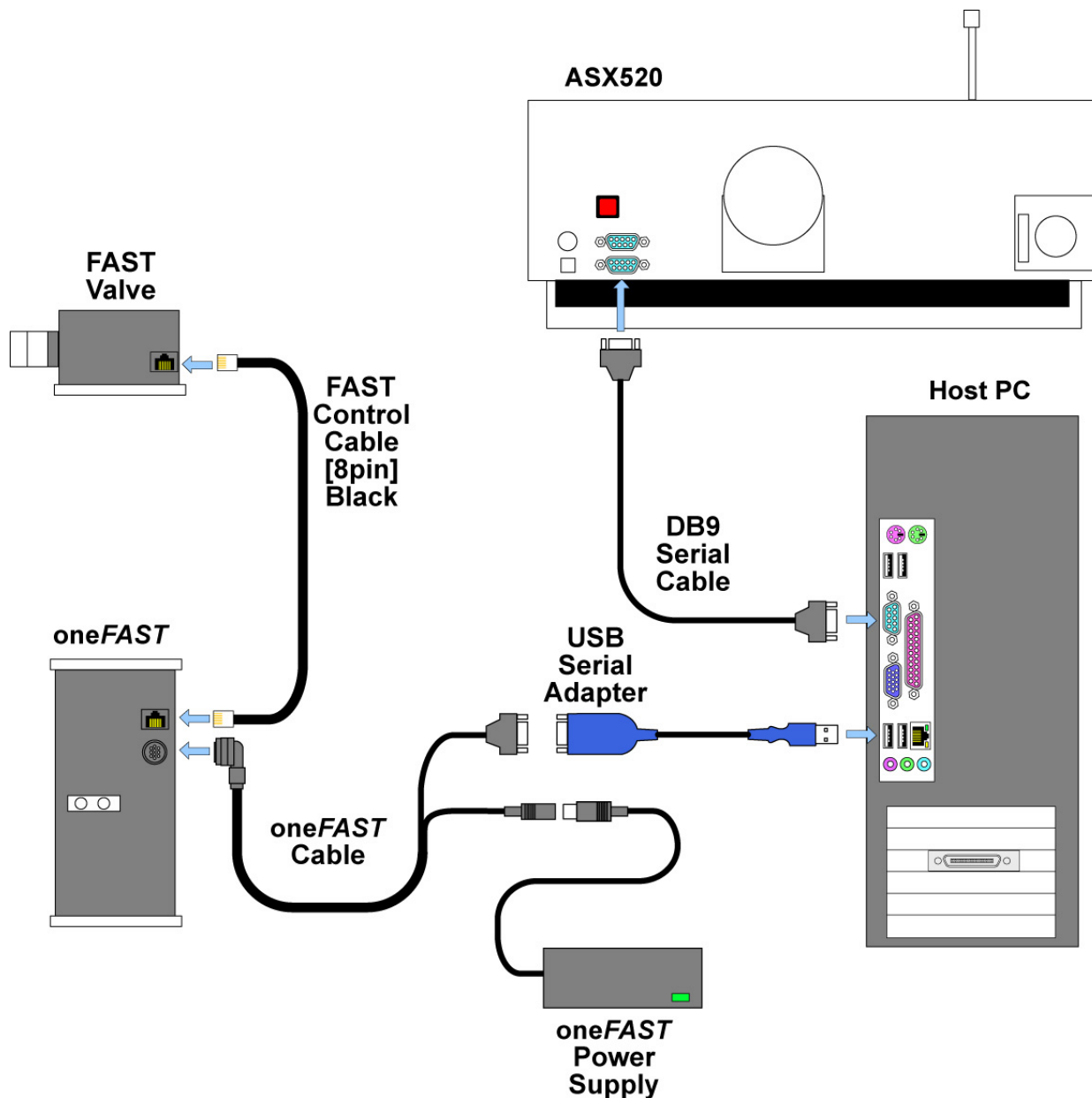


Figure 8: Connections for oneFAST with Optima and ASX-5xx.

### Hardware installation procedure:

- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions.
- 2) Install oneFAST software as described in “Software Installation” section. A reboot will be required.
- 3) Place the FAST valve as close as possible to the instrument’s nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.

- 4) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).



If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 5) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.
- 6) Power-ON all devices and start the oneFAST software.
- 7) In the oneFAST software, open the “Ports” menu.
- 8) Verify that the correct autosampler and instrument were automatically detected. If the autosampler name or instrument name require modification, select the appropriate names from the drop-down box and follow by clicking the red “Click to reconfigure” bar.
- 9) Select “RS-232 Virtual”, set the “Virtual Port” as **6** and click the red “Click to reconfigure” bar.



If port 6 is not available choose the next lowest port number.

- 10) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 11) Configure with appropriate trays by clicking on locations in autosampler image.
- 12) Run “Reconfigure” from the “Perkin Elmer WinLab32” Program Group.
- 13) Proceed to “Select autosampler model” and choose “Cetac” and click Next>.
- 14) Select the same COM port number as the “Virtual Port”; then continue through to “WinLab32 Configuration Complete.”
- 15) Start WinLab32 and select correct tray file using **Options>>Autosampler>>Browse**. Select the shortcut named “oneFAST ASX5xx Tray” or manually select the file at the following path: “C:\program files\esi\oneFAST\Support Files\Tray Files\oneFAST.CetacTray”

## Perkin Elmer WinLab32 Version 3.4 and S-10 (via VSP)

The oneFAST system should be connected as shown in the attached Figure 9.

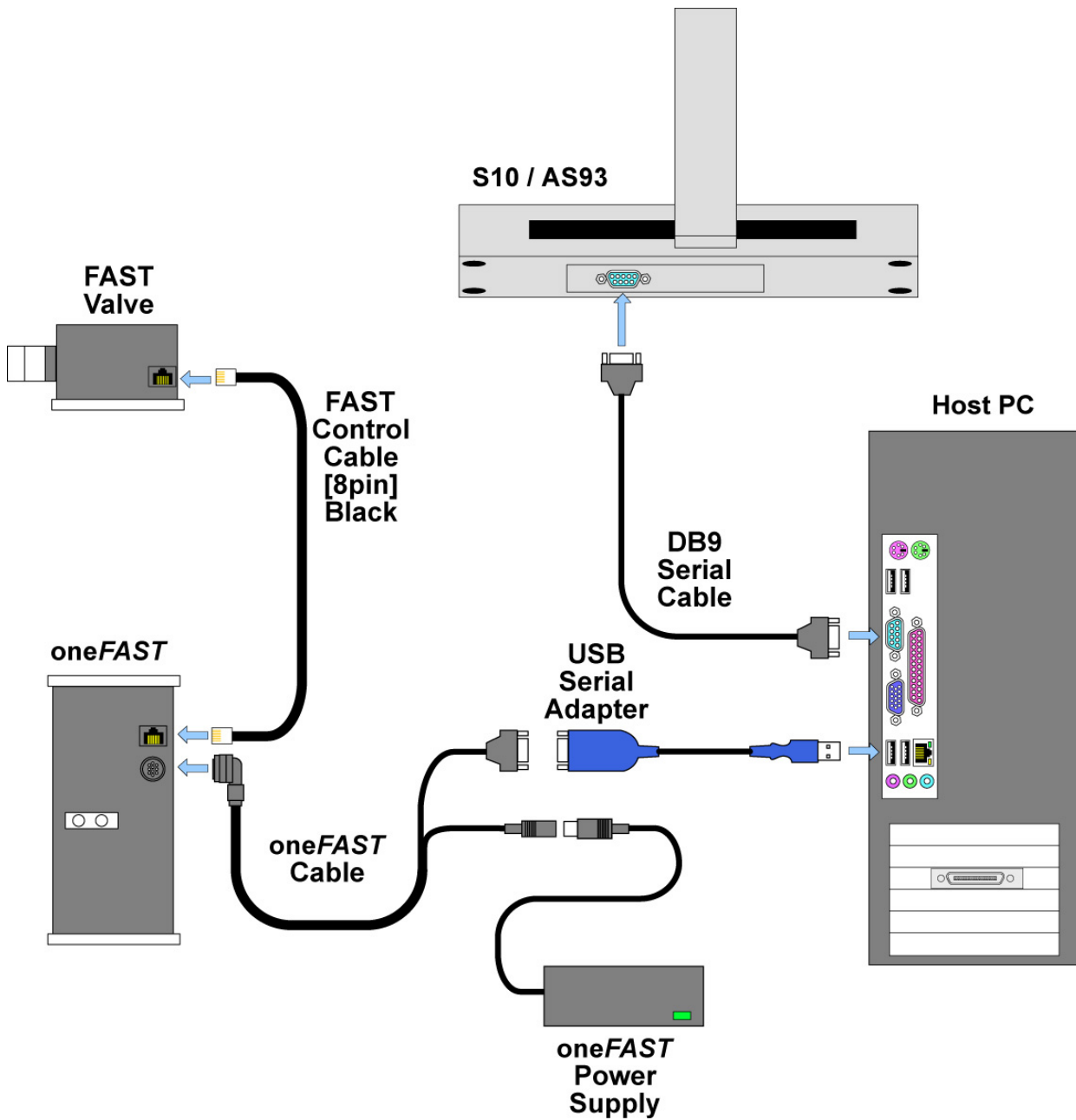


Figure 9: Connections for oneFAST with Optima and S10/AS93.

### Hardware installation procedure:

- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions.
- 2) Install oneFAST software as described in “Software Installation” section. A reboot will be required.

- 3) Place the FAST valve as close as possible to the instrument's nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.
- 4) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).



If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 5) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.
- 6) Power-ON all devices and start the oneFAST software.
- 7) In the oneFAST software, open the "Ports" menu.
- 8) Verify that the correct autosampler and instrument were automatically detected. If the autosampler name or instrument name require modification, select the appropriate names from the drop-down box and follow by clicking the red "Click to reconfigure" bar.
- 9) Select "RS-232 Virtual", set the "Virtual Port" as **6** and click the red "Click to reconfigure" bar.



If port 6 is not available choose the next lowest port number.

- 10) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 11) Configure with appropriate trays by clicking on locations in autosampler image.
- 12) Run "Reconfigure" from the "Perkin Elmer WinLab32" Program Group.
- 13) Proceed to "Select autosampler model" and choose "S-10" and click Next>.
- 14) Select the same COM port number as the "Virtual Port"; then continue through to "WinLab32 Configuration Complete."
- 15) Start WinLab32 and select correct tray file using **Options>>Autosampler>>Browse**. Select the shortcut named "oneFAST S10 Tray" or manually select the file at the following path: "C:\program files\esi\oneFAST\Support Files\Tray Files\oneFAST.S10Tray"

## iTEVA/TEVA and ASX-5xx (via VSP)

After the software is installed the oneFAST system should be connected as shown in the attached Figure 10. Start with step 1.

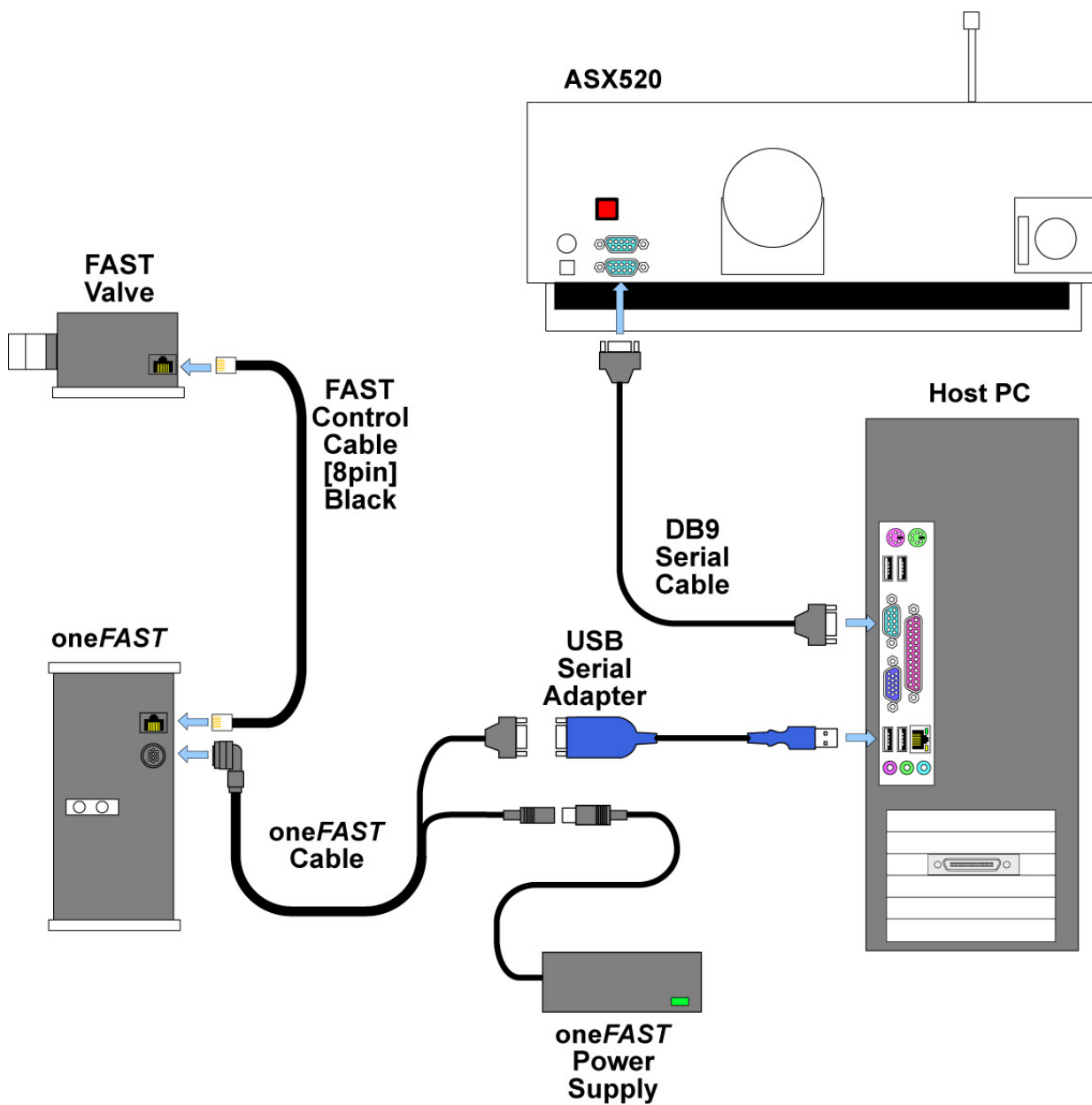


Figure 10: Connections for oneFAST with iTEVA/TEVA and ASX-5xx.

### Software Installation:

- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions.
- 2) Install oneFAST software as described in “Software Installation” section. A reboot will be required.

### Hardware Installation:

- 3) Place the FAST valve as close as possible to the instrument’s nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.
- 4) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).



If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 5) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.

### System Settings:

- 6) Start the **iTEVA/TEVA Control Center** and configure under **Tools>>Instrument Options>>Autosampler**. Select Cetac ASX-520 or Cetac and COM1 or COM2 as the current sampler and click **OK**.
- 7) Next, using **Start>>Settings>>Control Panel>>System>>Hardware>>Device Manager>>Ports**. Locate the COM port this is currently used to control the autosampler. This COM# will match the number that is used in step (6). Rename to COM9.



To change a COM port number, right-click on the device then **Properties>>Port Settings>>Advanced**.

- 8) Locate the iTEVA or TEVA install directory depending on the instrument software.

If iTEVA: **\Program Files\Thermo\iTeva\SysData**.

If TEVA: **\Program Files\Thermo Elemental \Teva\SysData**.

Create copies of existing **AutoSamplerConfigurations.xml**, and **AutoSamplerConfigurationSets.xml** files adding a prefix "orig\_".

### Autosampler Configuration:

- 9) Power-ON all devices and start the oneFAST software.
- 10) In the oneFAST software, open the “Ports” menu.
- 11) Verify that the correct autosampler was automatically detected.

- 12) Select the Instrument name as **iTEVA** or **TEVA** from the drop-down box and follow by clicking the red “Click to Re-Configure” bar. The user will then be prompted to select the location of the AutoSamplerConfiguration files.

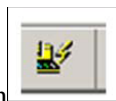
If **iTEVA**: **\Program Files\Thermo\iTeva\SysData**.

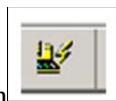
If **TEVA**: **\Program Files\Thermo Elemental \Teva\SysData**.

- 13) Select “RS-232 Virtual” and select the COM number defined in step (6) from the list in “Virtual Port” and click the red “Click to reconfigure” bar.
- 14) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 15) Configure with appropriate trays by clicking on locations in autosampler image. Please note that because the MAP files are being generated, that there may be a short delay before the window closes.

#### **Host Software Configuration:**

- 16) Using **iTEVA/TEVA Control Center>Applications>Analyst>Sequence>Auto-Session>New Autosampler**, the **Cetac by oneFAST** choice will be available. Click OK, a graphic representation of the autosampler layout will appear.



- 17) Connect the autosampler using the connect icon .
- 18) Move autosampler by right-clicking on vial location and selecting "Go to..." to verify that control is established.

## Thermo PlasmaLab and ASX-5xx (via VSP)

After the software is installed, the oneFAST system will be connected as shown in the attached Figure 11. Start with step 1.

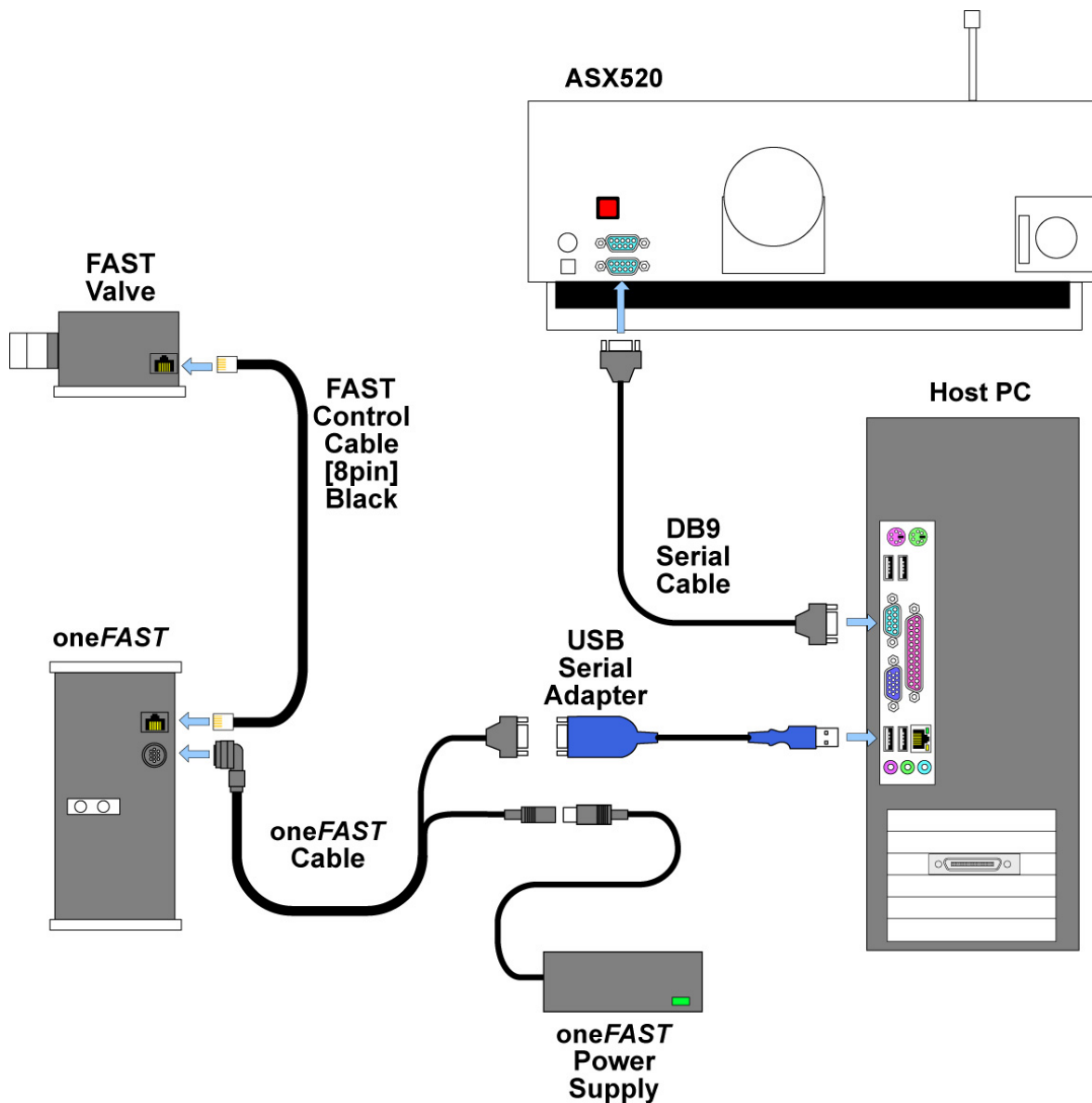


Figure 11: Connections for oneFAST with PlasmaLab and ASX-5xx.

### Software Installation:

- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions. Locate the **Instrument>>Configurations>>Configuration Editor** in the PlasmaLab and determine what COM port is currently used to control the ASX-5xx. This COM number will be defined in following steps as the Instrument Port number. Please note this number for reference.
- 2) Install oneFAST software as described in “Software Installation” section. A reboot will be required.

### Hardware Installation:

- 3) Place the FAST valve as close as possible to the instrument's nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.
- 4) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).



If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 5) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.

### System Settings:

- 6) Next, using **Start>>Settings>>Control Panel>>System>>Hardware>>Device Manager>>Ports**. Locate the COM port matching the defined Instrument Port in step (1), and rename to an available number that is not listed in the **Ports** group.



To change a COM port number, right-click on the device then **Properties>>Port Settings>>Advanced**.

### Autosampler Configuration:

- 7) Power-ON all devices and start the oneFAST software.
- 8) In the oneFAST software, open the "Ports" menu.
- 9) Verify that the correct autosampler was automatically detected.

Select the Instrument name as **Thermo PlasmaLab** from the drop-down box and follow by clicking the red "Click to Re-Configure" bar.

- 10) Select "RS-232 Virtual" and select COM# as the (Instrument) Port Number. The COM# will match the Instrument Port number determined in step (6). Next, click the red "Click to reconfigure" bar.
- 11) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 12) Configure with appropriate trays by clicking on locations in autosampler image.

### Host Software Configuration:

- 13) Configure the PlasmaLab rack layout using the **Instrument>>Configurations>>Configuration Editor** window in the PlasmaLab software. Select the Cetac 500 from the **Available Accessories & Devices**. If this device is not present in PlasmaLab 2.0, run the **Accessory Wizard** and add the Cetac 500. If this device is not present in PlasmaLab 1.0, choose **Instrument>Accessories** then **Add>>** the Cetac 500 from the Available Devices. The device should be set to COM#, 9600 and the racks should match the layout of the oneFAST software. The COM# will match the Instrument Port number determined in step (6). If the COM port is not visible as a selection please refer to technical note [TN040908](#).
- 14) Connect the autosampler using the connect icon.



## Varian ICP Expert I & II and ASX-5xx (via VSP)

After the software is installed, the oneFAST system will be connected as shown in the attached Figure 12. Start with Step 1.

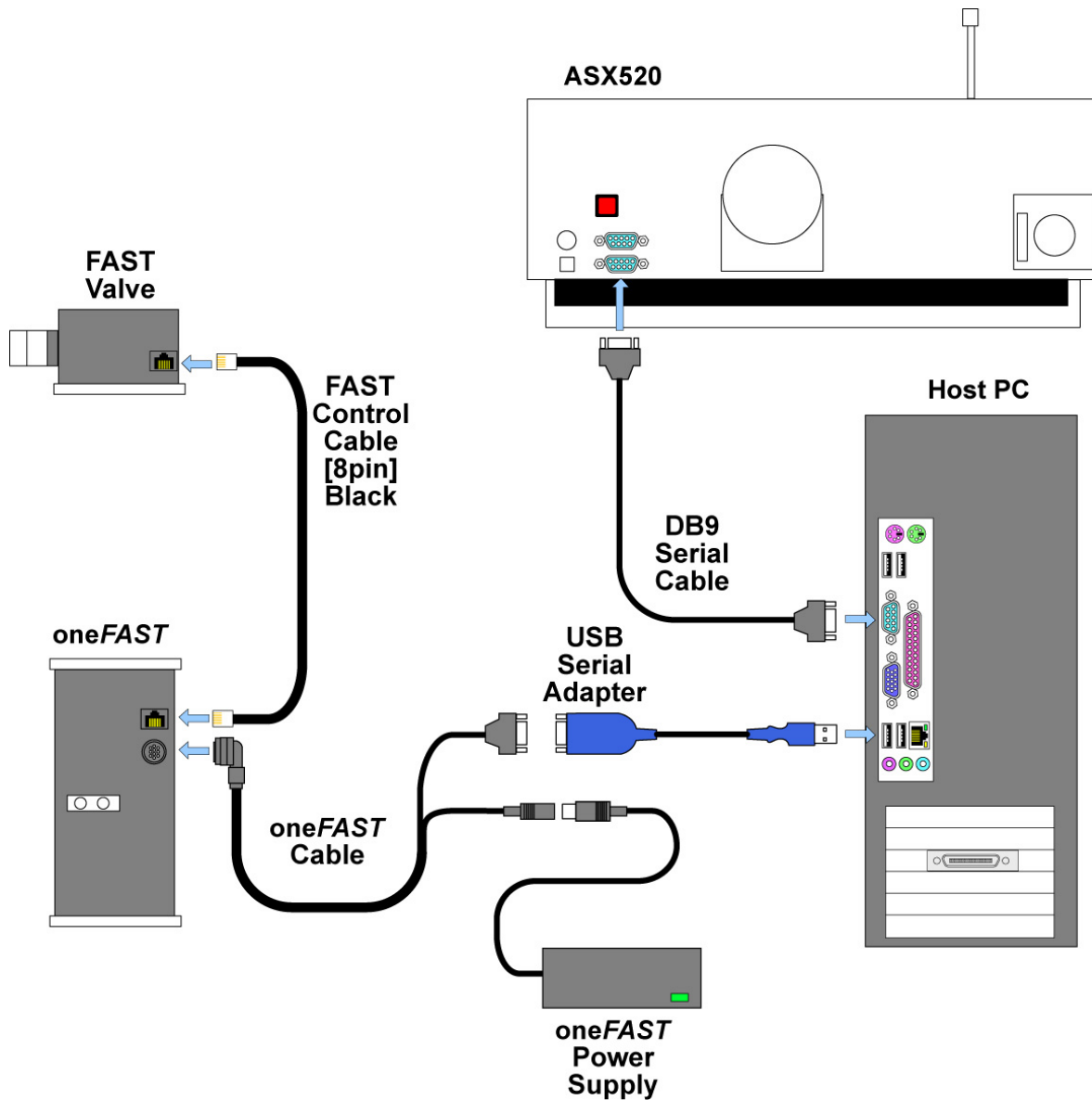


Figure 12: Connections for oneFAST with ICP Expert and ASX-5xx.

### Software Installation:

- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions. Locate the **Options>>Preferences...>>Autosampler** in the ICP Expert and verify configuration as ASX-5xx. ICP Expert requires that COM 1 be defined in following steps as the Instrument Port number.
- 2) Install oneFAST software as described in “Software Installation” section. A reboot will be required.

## Hardware Installation:

- 3) Place the FAST valve as close as possible to the instrument's nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.
- 4) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).



If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 5) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.

## System Settings:

- 6) Next, using **Start>>Settings>>Control Panel>>System>>Hardware>>Device Manager>>Ports**. Locate the COM port matching the defined Instrument Port in step (1), and rename to an available number that is not listed in the **Ports** group.



To change a COM port number, right-click on the device then **Properties>>Port Settings>>Advanced**.

## Autosampler Configuration:

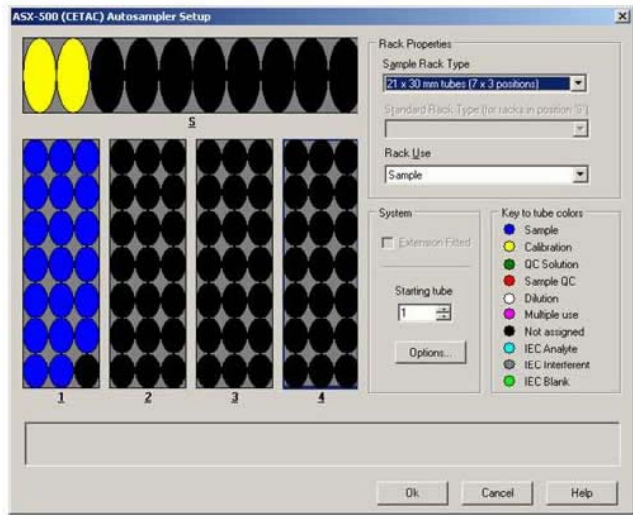
- 7) Power-ON all devices and start the oneFAST software.
- 8) In the oneFAST software, open the "Ports" menu.
- 9) Verify that the correct autosampler was automatically detected.

Select the Instrument name as **Varian ICP OES/MS** from the drop-down box and follow by clicking the red "Click to Re-Configure" bar.

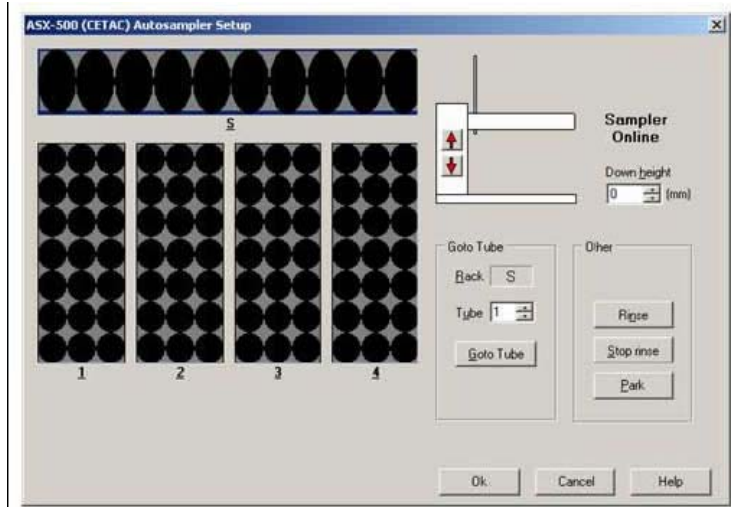
- 10) Select "RS-232" *Virtual* and select COM# as the (Instrument) Port Number. The COM# will match the Instrument Port number determined in Step (6). Next, click the red "Click to reconfigure" bar.
- 11) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 12) Configure with appropriate trays by clicking on locations in autosampler image.

## Host Software Configuration:

- 13) Configure the ICP Expert rack layout using the **Sequence>>Autosampler Setup...>>** window in the ICP Expert software. It is required that the rack layout in the ICP Expert match the layout of the oneFAST software.



14) Verify control of ASX-5xx using ICP Expert>>Window>>Autosampler....



## Varian ICPMS Expert and ASX-5xx (via VSP)

After the software is installed, the oneFAST system will be connected as shown in the attached Figure 13. Start with Step 1.

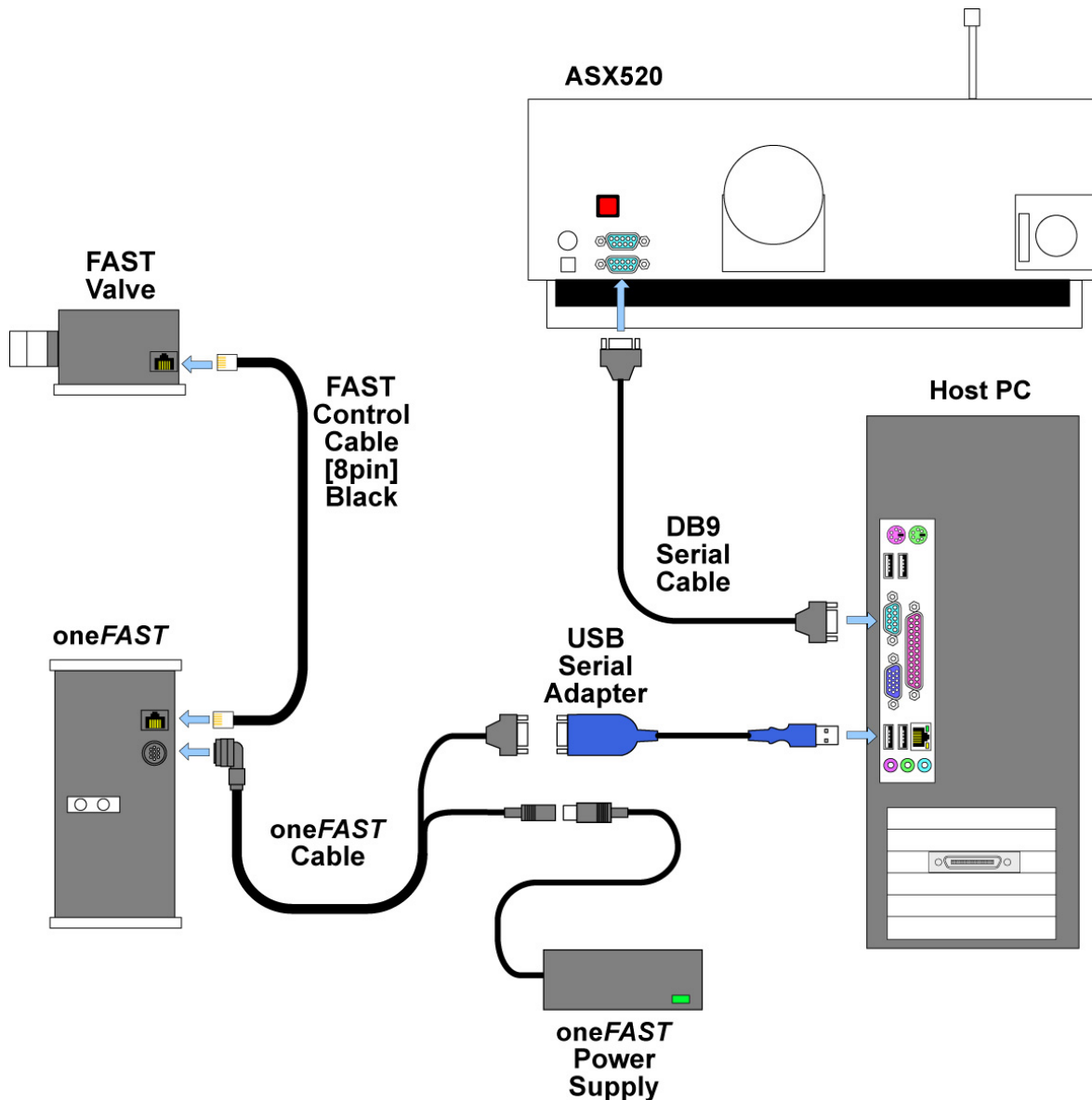
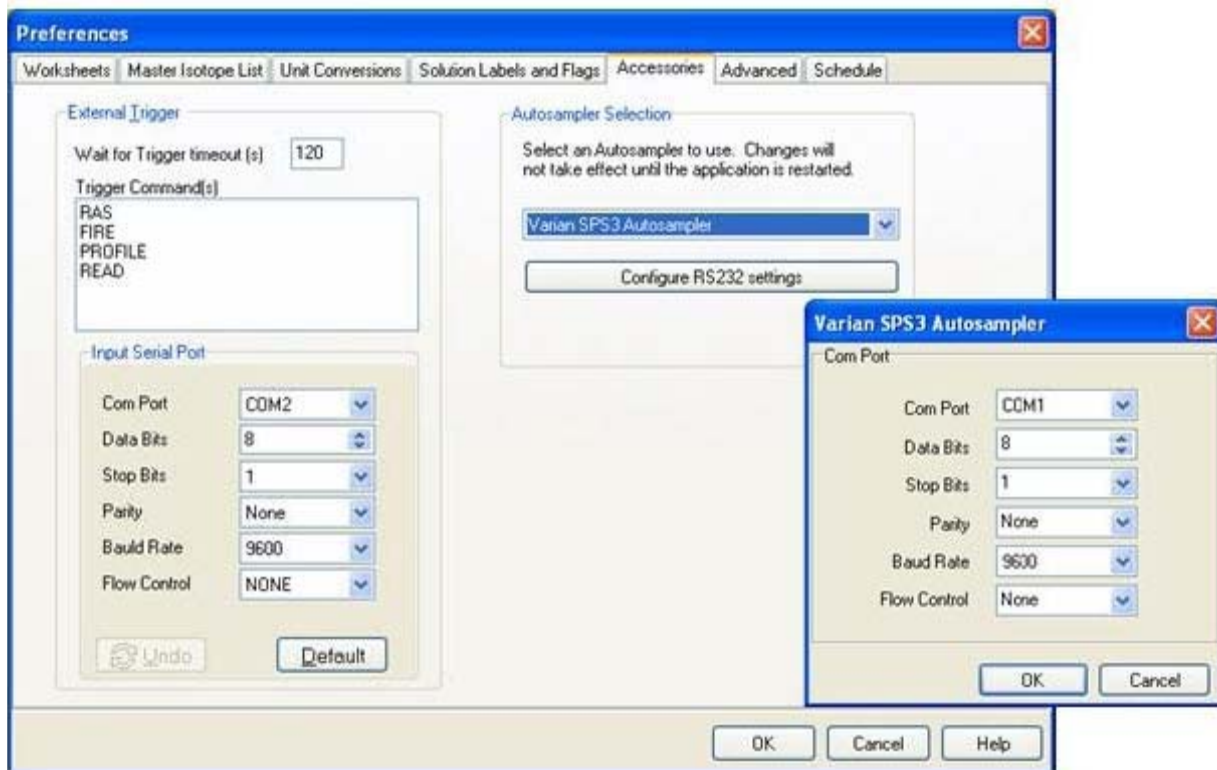


Figure 13: Connections for oneFAST with ICPMS Expert and ASX-5xx.

### Software Installation:


- 1) Verify that the host computer has proper control of autosampler before installing any oneFAST components. Please follow instrument and autosampler instructions. Next, locate the **Options>>Preferences...>>Accessories>>Autosampler Selection** in the ICPMS Expert and verify configuration as ASX-5xx. Next, in “Configure RS232 Settings”, note the “Com Port” number used. This number will be referred to in following steps as the Instrument Port number.



- 2) Install oneFAST software as described in “Software Installation” section. A reboot will be required.

### Hardware Installation:


- 3) Place the FAST valve as close as possible to the instrument’s nebulizer/spray chamber and use the FAST Control Cable [8-pin] (SC-0599-2005), to connect the valve to the oneFAST controller.
- 4) Connect the oneFAST controller to computer using the oneFAST cable (SC-0212-0400) and a USB-Serial Adapter (SC-0905).

 If a DB-9 port is not available on the computer, a USB-Serial Adapter (SC-0905) may be used. It is recommended that the same type of adapters be used throughout the system to minimize driver conflicts.

- 5) Connect the oneFAST controller to power supply (SC-0210) using the oneFAST cable.

### System Settings:

- 6) Next, using **Start>>Settings>>Control Panel>>System>>Hardware>>Device Manager>>Ports**. Locate the COM port matching the defined Instrument Port in step (1), and rename to an available number that is not listed in the **Ports** group.

 To change a COM port number, right-click on the device then **Properties>>Port Settings>>Advanced**.

### Autosampler Configuration:

- 7) Power-ON all devices and start the oneFAST software.
- 8) In the oneFAST software, open the “Ports” menu.
- 9) Verify that the correct autosampler was automatically detected.

Select the Instrument name as **Varian ICP OES/MS** from the drop-down box and follow by clicking the red “Click to Re-Configure” bar.

- 10) Select “RS-232” *Virtual* and select COM# as the (Instrument) Port Number. The COM# will match the Instrument Port number determined in Step (1). Next, click the red “Click to reconfigure” bar.
- 11) Verify that the three Status Bars are green then click **OK** to close the window and save settings.
- 12) Configure with appropriate trays by clicking on locations in autosampler image.

#### **Host Software Configuration:**

- 13) Configure the Varian rack layout using the **Sequence>>Sampling Setup** window in the ICP-MS Expert software. The specified rack dimension type should match the corresponding rack in the oneFAST software.
- 14) Verify control using **ICP-MS Expert>>Window>>Autosampler Control**.



If communication loss or “off-line” errors are encountered due to resource limitations, please refer to technical document (TN061108).

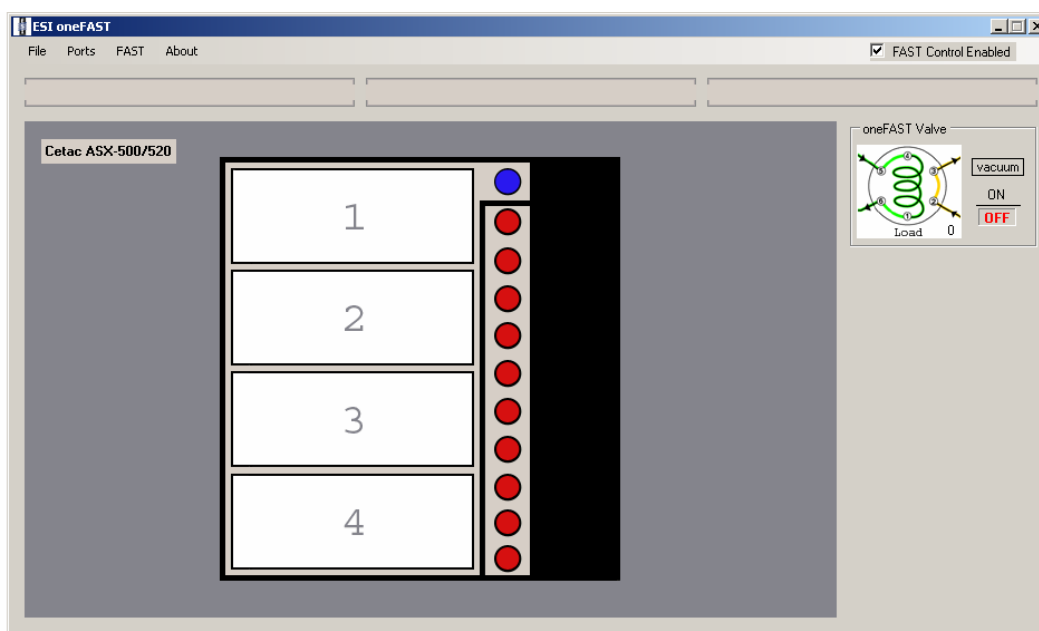
## Software Overview

The oneFAST software must be running to enable the use of the oneFAST system. Additionally, ESI recommends that the following order of start-up be followed.

Starting order of configuration components:

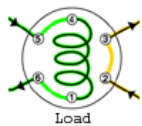
- 1) Power on autosampler and oneFAST modules.
- 2) Start the oneFAST software and verify that all devices were detected.
- 3) Start the instrument software.

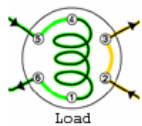
The main window contains the following controls which may be used to configure the autosampler racks, operate oneFAST modules or enable/disable the FAST method. Please refer to Figure 14: Main window of oneFAST software. The autosampler graphic will change to reflect the autosampler detected when the oneFAST software is started. If no autosampler is found, the message “No Autosampler Found” will be visible instead.



**Figure 14: Main window of oneFAST software.**

- Clicking on the rack locations in the autosampler graphic will permit the user to place a desired rack from a given list as shown in Figure 15.



- Clicking on the image  will toggle the valve between Load and Inject positions. The current position of the valve is also reflected in the image.
- Clicking on the checkbox  FAST Control Enabled will enable or disable the FAST method from processing instructions received from the instrument software.



- Clicking on the image will toggle the vacuum between ON and OFF. The current state of the vacuum is also reflected in the image.

When placing desired racks onto the image of the autosampler, additional options may be available depending on emulation and autosampler. Choices/settings available through the Rack window will include:

- Specification of probe Down Height, or the depth, that the probe will advance into the sample tube,
- Specification of the order or direction that the tubes will be counted/incremented within the rack.

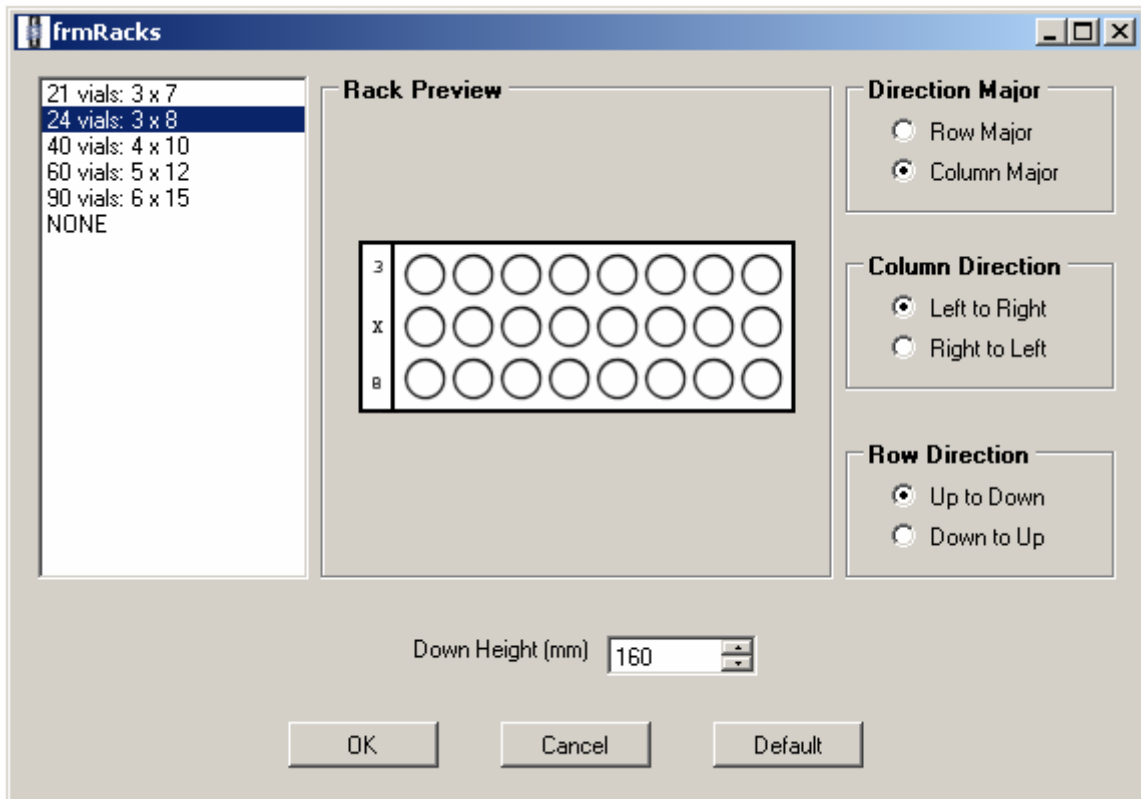


Figure 15: Racks Window and settings.

## Menu Items

The main window provides access to the following windows or selections:

### ESI oneFAST>>File

This menu permits the user to close the application and thereby saving current configuration.

### ESI oneFAST>>Ports

The Ports window, Figure 16, will provide access to manually configure the oneFAST system. In most cases, the user will not need to use this window other than during the initial selection of a Virtual Port during initial setup. All three “status” bars should be green when the system is properly configured.

The tab labeled “ESI Configured Ports” presents information regarding both hardware devices and communication ports used. Hardware information located in the “Emulation” grouping includes the type of Autosampler used and the type of Instrument or host software that will control the autosampler and oneFAST. The Port Number refers to the COM port number that is associated with the serial port that is connected to the autosampler. This serial port may be a 9-pin port on the computer or a USB-serial port. The value Port Number in the “Instrument Port (*instrument*)” grouping specifies the port number to be used when the oneFAST software creates a COM port that is used for communication between the Instrument software and the oneFAST software. If the configuration uses a physical COM port, it will be identified accordingly. The user can select the type of connection between the oneFAST software and the instrument software by choose “RS-232 Virtual” or “RS-232 Physical”.

The tab labeled “All System Ports” provides some assistance in determining which devices are connected to a given port.

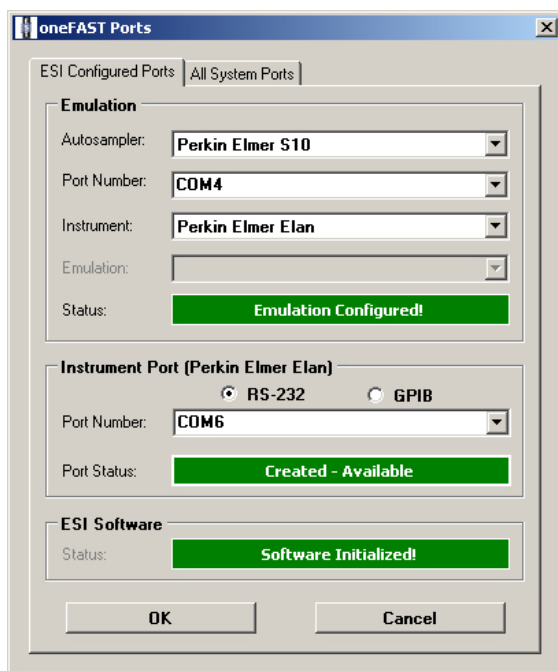


Figure 16: Ports Window.

### ESI oneFAST>>FAST

This window provides access to the FAST method assigned to the current oneFAST configuration. The following controls are available to the user. See Figure 17

- 1) A method can be opened or saved using the **File** menu.
- 2) **FAST Method File Name**: identifies the name of the current FAST method.
- 3) A FAST Method can be created by “Drag-and-Dropping” from the **Events** and **Actions** listings.
- 4) **Rinse Time (sec)**: Shows how long the probe will stay at the rinse station(s).
- 5) **Enable FAST Control**: Activates or de-activates the FAST method from executing when instructions are received from the instrument. If not checked, the autosampler will behave as instructed by the instrument and no FAST actions will be processed.

- 6) **Vacuum Time (sec):** Limits the length of time that the vacuum will remain on at the end of an analysis sequence.
- 7) **Manual Controls:** Allows the user to manually operate the FAST valve and vacuum.

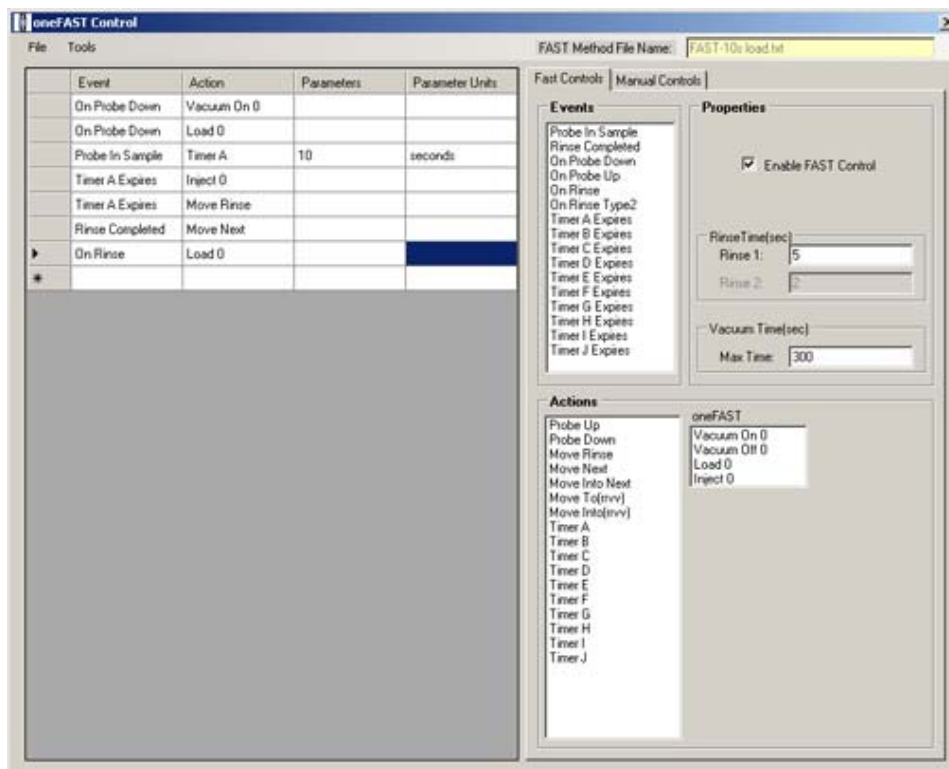


Figure 17: FAST method window.



Integration with an SC Autosampler will provide the full set of FAST features; however, depending on the autosampler used, some features may not be available.

### ESI oneFAST>>About

The About menu will contain information regarding version number and access to help documents.

## oneFAST Applications

A typical sample analysis will consist of a FAST method as outlined in the following Figure 18.

	Event	Action	Parameters	Parameter Units
a)	On Probe Down	Vacuum On 0		
b)	On Probe Down	Load 0		
c)	Probe In Sample	Timer A	10	seconds
d)	Timer A Expires	Inject 0		
e)	Timer A Expires	Move Rinse		
	Rinse Completed	Move Next		
	On Rinse	Load 0		
	*			

**Figure 18: Typical FAST Method.**

The arrangement of the FAST method associates corresponding Actions in the second column, to Events defined in the first column. Parameters if required, can be entered/modified in the third column. In the example from Figure 18, the following lines result in the following actions or movements of FAST components.

- a) When the host instrument instructs the probe to move down into a sample (On Probe Down), the Vacuum will turn ON (Vacuum On 0) and the FAST Valve will move to the Load position (Load 0).
- b) When the probe reaches the bottom of the sample tube (Probe In Sample) a timer is started that will expire after 10 seconds, (Timer A)(10).
- c) When Timer A expires, the FAST Valve will move to the Inject position (Inject 0) and the autosampler will be instructed to wash/rinse the probe, (Move Rinse).
- d) When the “probe wash” has finished, the autosampler will be instructed to move over the next predicted sample tube (Move Next).
- e) When the host instrument sends a wash/rinse instruction (On Rinse), the FAST valve will move to the Load position (Load 0).

### Typical Sample Analysis

The typical sample analysis will consist of configuring the loading and injecting of a loop of sample to the nebulizer. In addition, the oneFAST software will manage the operations of the FAST valve, vacuum, and autosampler, while synchronizing to the control of the host software that manages the instrument. The two basic arrangements of the system and liquid flow paths are illustrated in the following diagrams.

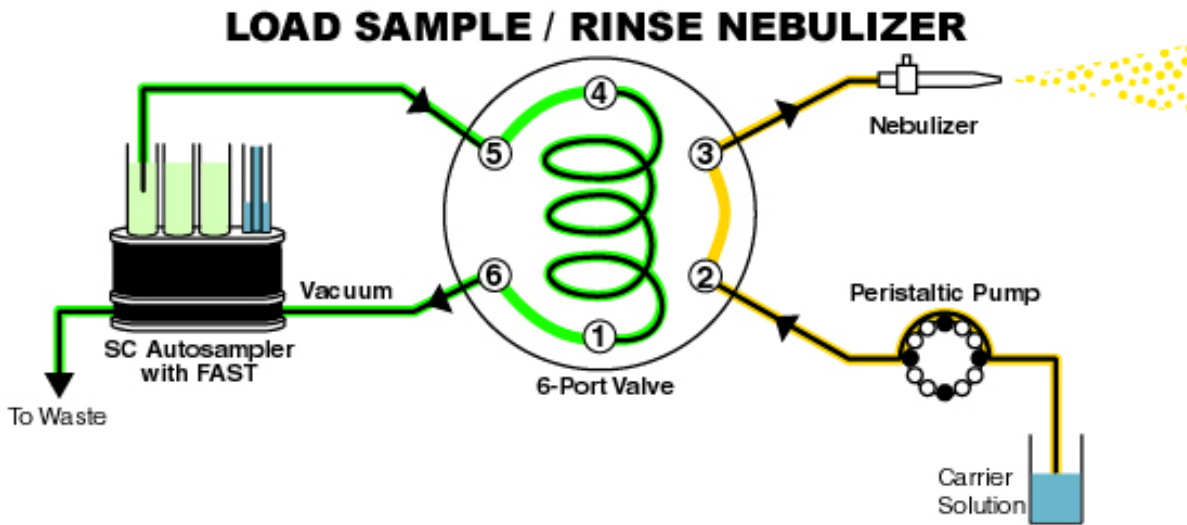


Figure 19: Load position.

At the beginning of a sample analysis, the vacuum will rapidly draw sample through the autosampler probe and Load the loop. At the same time the instrument's peristaltic pump will advance clean carrier solution to nebulizer.

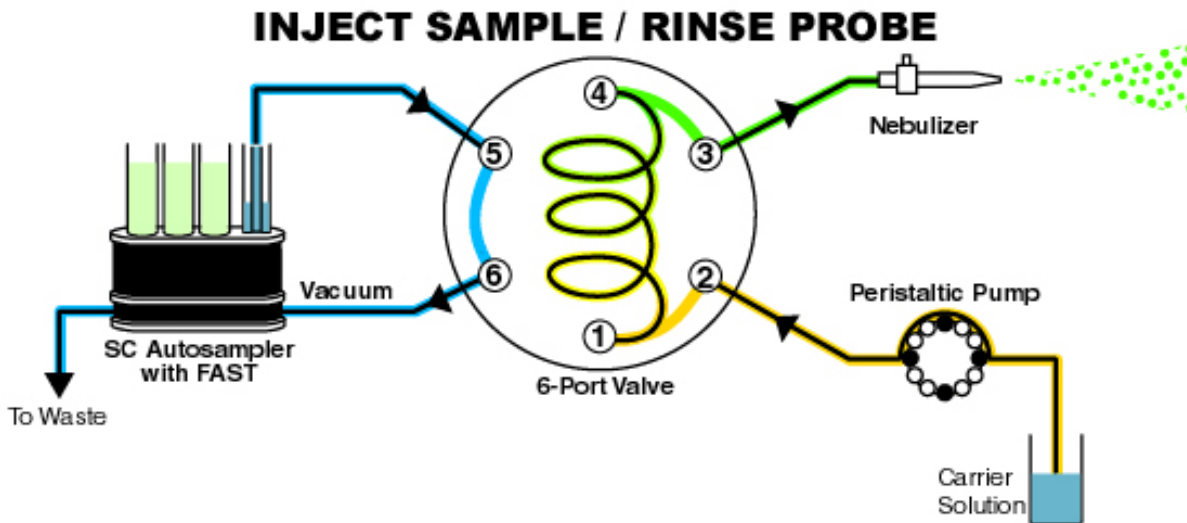


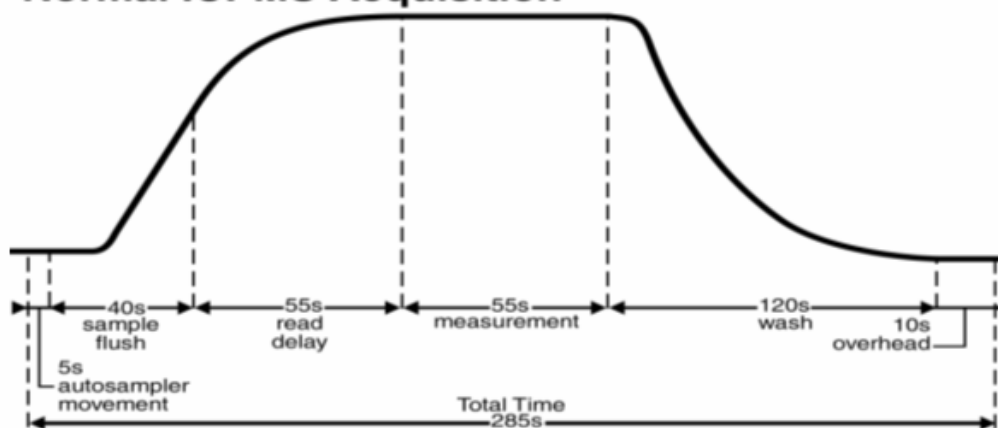
Figure 20: Inject Position.

With a full loop of sample, the valve will then be switched to the Inject position, where the clean carrier will advance the sample volume to the nebulizer and into the instrument to be analyzed. In a well configured system the FAST valve will be positioned as close as possible to the nebulizer therefore reducing the time necessary for the sample to arrive at the nebulizer.

The resulting benefits to a sample analysis due to the implementation of the oneFAST can include the following:

- 1) Reduced sample analysis time. Refer to Figure 21. Shown is an example of how the analysis time is reduced.
- 2) Reduced instrument maintenance. Since the sample loop is the only sample volume that is presented to the spray chamber, system maintenance and cleaning is reduced since less "dirty" sample material will deposit on surfaces such as cones.

## Normal ICPMS Acquisition



## FAST ICPMS Acquisition

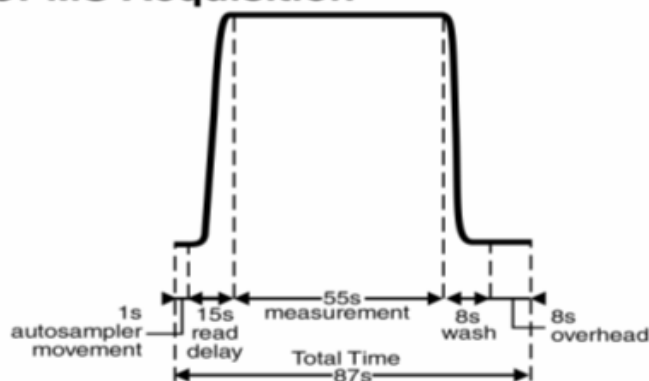


Figure 21: Example of reduced analysis time.

### Tuning the Instrument when connected to FAST

If the instrument requires routine calibration, this can be accomplished by moving the carrier probe from the carrier solution and placing it in the “tuning” solution. Simply place the probe back into the carrier in preparation for sample analysis.

### Important Design Criteria for a FAST Method

The following should be considered when improving performance and increasing throughput with the use of the oneFAST system.

Use the smallest possible loop that will still provide enough sample volume required for analysis.

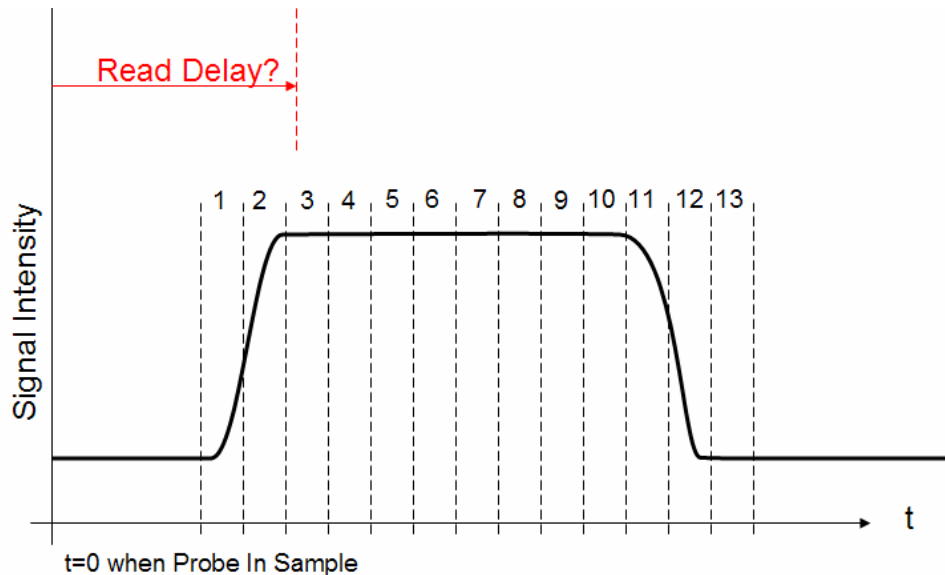
The basic elements of a sample analysis consist of 1) autosampler movement, 2) sample uptake time, 3) stabilization time, 4) measurement time, 5) instrument overhead time and 6) rinse/wash time. The FAST system can reduce sample analysis time by efficiently transporting the sample to the nebulizer then simultaneously rinsing the transport line and probe while the instrument is analyzing the sample.

Higher sample throughput and shorter sample analysis times require the selection of a loop that will both provide an adequate sample volume for measurement and also be as small as possible to reduce loading and rinse times.

## Setting Read-Delay

The optimum “Read-Delay” should be determined so that the ICP method can start measurements as soon as possible. The effective “Read-Delay” time in the instrument method will include the following:

- a) Loop Load time in the FAST method,
- b) Sample travel time from valve to nebulizer,
- c) Signal stabilization time.



**Figure 22: Signal Intensity during FAST method.**

The suitable “Read-Delay” will be the time between when the instrument tells the probe to move into the sample vial and when the signal has stabilized. This example diagram, see Figure 22, represents a series of 13 replicates. If each replicate is 1 second long and the first starts 4 seconds after the probe has entered the sample vial, it is reasonable to consider a “Read-Delay” of approximately 6 seconds. The diagram also indicates that there is approximately 8 seconds of stable signal for analysis.

## Setting Wash/Rinse Time

It is important to configure the instrument’s wash/rinse time sufficiently long so that the following two actions occur.

- 1) When the wash/rinse instruction is received from the host instrument, the valve will switch to Load and the loop will evacuate.
- 2) The MoveNext action should occur, placing the probe above the next predicted sample before the wash/rinse time expires.

## Additional Features

The following is a list of additional features provided by the oneFAST system. These are often dependent on the host instrument and autosampler combination used.

- 1) Flexibility in generating a combination of different rack types within the same layout,
- 2) Control of tube count directions within the rack,

## Maintenance

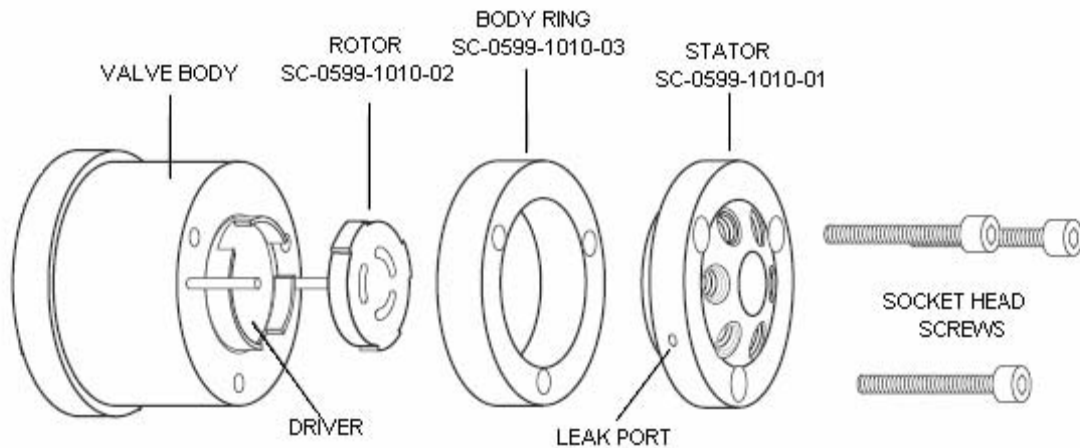
### Maintenance for High Flow FAST Valve

#### Initial Precaution

All surfaces of the valve should be clean and free of contaminants and must be kept clean to prevent valve damage. Open ports and fittings cause unnecessary risk of particulate matter entering the valve and scratching the sealing surfaces, which is the most frequent cause of premature valve failure.

#### Disassembly and Cleaning

1. Cleaning a valve can often be accomplished by flushing all the lines with appropriate solvents, such as isopropyl alcohol. Do not disassemble the valve unless system malfunction is definitely isolated to the valve.
2. To disassemble the valve, use a 7/64" hex driver to remove the socket head screws which secure the stator and body ring onto the valve body.



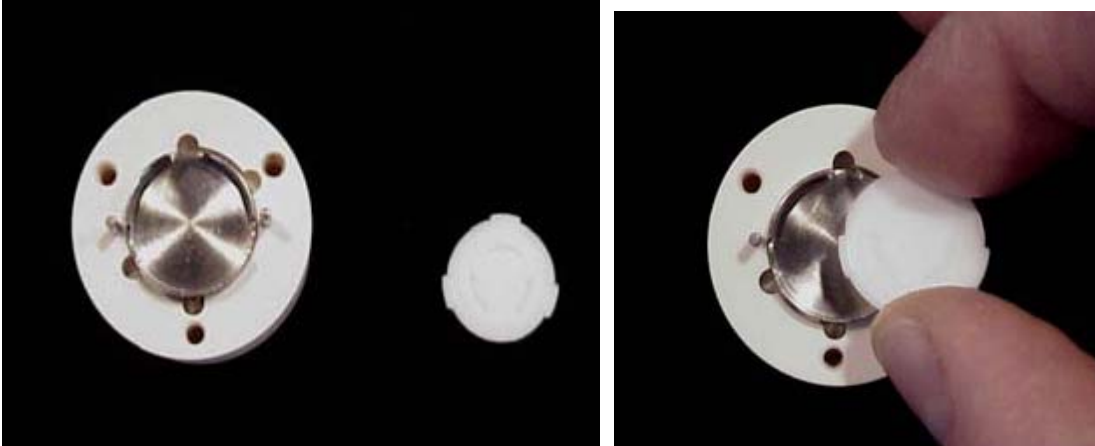
**Figure 23: Exploded View of the High Flow Valve**

3. To prevent any damage to the sealing surface of the stator, rest it on its outer face. If the tubing is still connected, leave it suspended by the tubing.
4. With your fingers or a small tool, gently pry the rotor away from the driver on the body of the valve.
5. Examine the rotor sealing surface for scratches. If scratches are visible to the naked eye, the rotor must be replaced.
6. Clean all parts thoroughly with an appropriate solvent, such as isopropyl alcohol, while taking care that no surfaces get scratched.
7. Carefully examine all ports in the stator for Teflon shavings. If shavings are present, use canned air to direct airflow from the opposite side of the stator through each individual port.

8. Use a foam swab with isopropyl alcohol to gently clean the threads of the port, being careful not to force any shavings deeper into the port. Once this has been completed, repeat step 7 with canned air.

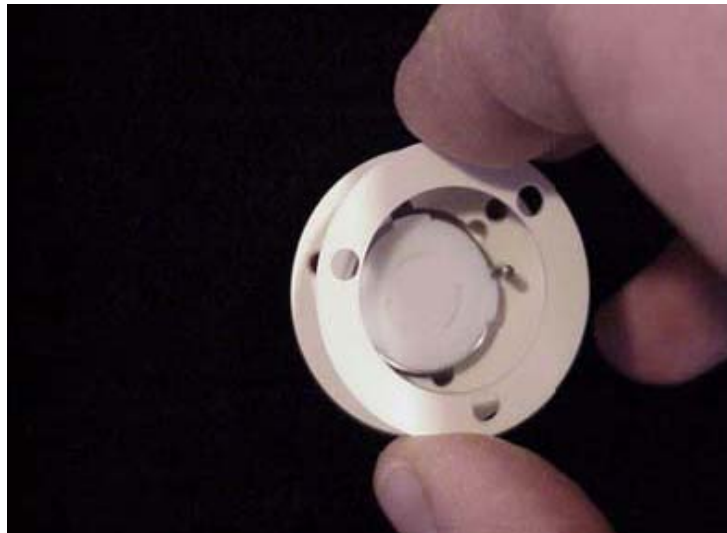
### Reassembly

1. Replace the rotor in the driver on the body, making sure that the rotor sealing surface, with its engraved flow passages, is facing out. The pattern is asymmetrical to prevent improper placement so be sure to align the rotor correctly into the slots on the driver.



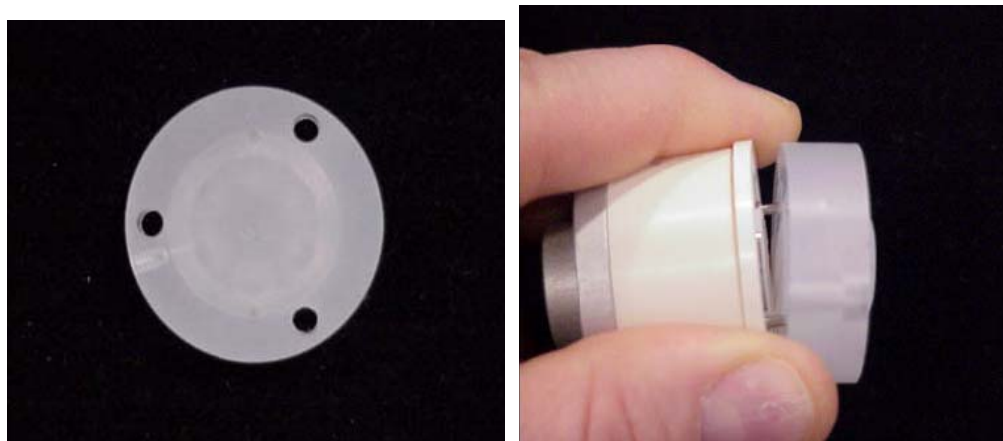
**Figure 24: Replacing rotor into the driver.**

2. Replace the body ring, being careful to align the holes for the socket head screws.

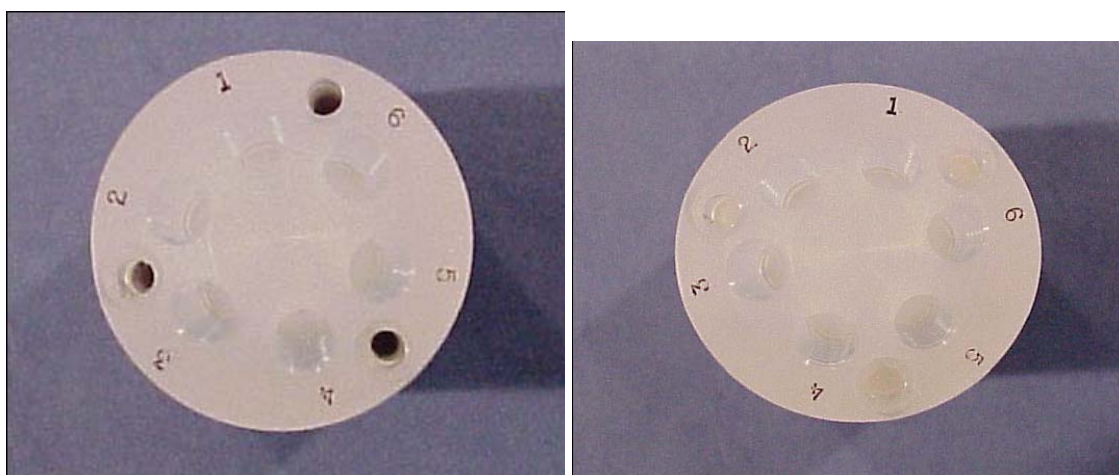


**Figure 25: Replacing body ring.**

3. Replace the stator by aligning the two holes on the back of the stator with the pins on the body of the valve. The pattern is asymmetrical so be sure that the holes for the socket head screws are aligned.



**Figure 26: View of aligning pins and replacing the stator.**



**Figure 27: Correctly aligned stator left, and incorrect on right.**

4. Insert socket head screws and tighten them gently until snug. **Be careful not to over-tighten them!** The screws simply hold the assembly together and do not affect the sealing force, which is automatically set as the screws tighten the stator against the valve body.



**Figure 28: Reassembled High-Flow Valve.**

5. Valve reassembly is now complete, and the lines for the FAST valve can now be reconnected.
6. Attach ends of the loop with white fittings to port #1 and to port #4 on the stator of the FAST valve.

7. Attach the Carrier In line with red fitting to port #2.
8. Attach the Nebulizer line with green fitting to port #3.
9. Attach the Probe line with blue fitting to port #5.
10. Attach the Vacuum line with black fitting to port #6.

## Technical Notes

This section contains technical notes.

Document Number	Title	Description
<a href="#">TN280508</a>	Autostart Batch File Examples-oneFAST	Examples of batch files that can be used to start the oneFAST software and instrument software.
<a href="#">TN290508</a>	Using a GPIB-232CV-A with oneFAST	Use of National Instruments GPIB-232CV-A with oneFAST.
<a href="#">TN010608</a>	Using an ICS 4894 with oneFAST	Use of an ICS 4894 with oneFAST.
<a href="#">TN040908</a>	Virtual Port not Visible in PlasmaLab	Desired COM port is not available through PlasmaLab
<a href="#">TN050508</a>	Setting Background Services Priority	Recommended to improve system performance.
<a href="#">TN061108</a>	Elevating the Priority of oneFAST	Assists to overcome resource limitations on computer.

## **Autostart Batch File Examples-oneFAST (TN280508)**

The user may choose to create an Autostart “Batch” file that will start both the instrument software and the oneFAST software by clicking a single icon. It is recommended that the created batch file be properly tested and evaluated before use.

## Using a GPIB-232CV-A with oneFAST (TN290508)

This document will illustrate the proper configuration and use of a National Instruments GPIB-232CV-A that is provided with the AS-93+ or the ASX-500. The combination of these DIP switch settings and the addition of a Null adapter (SC-0906) along with a DB9 M/F Serial Cable (SC-0904), can be used to connect the converter to the computer.

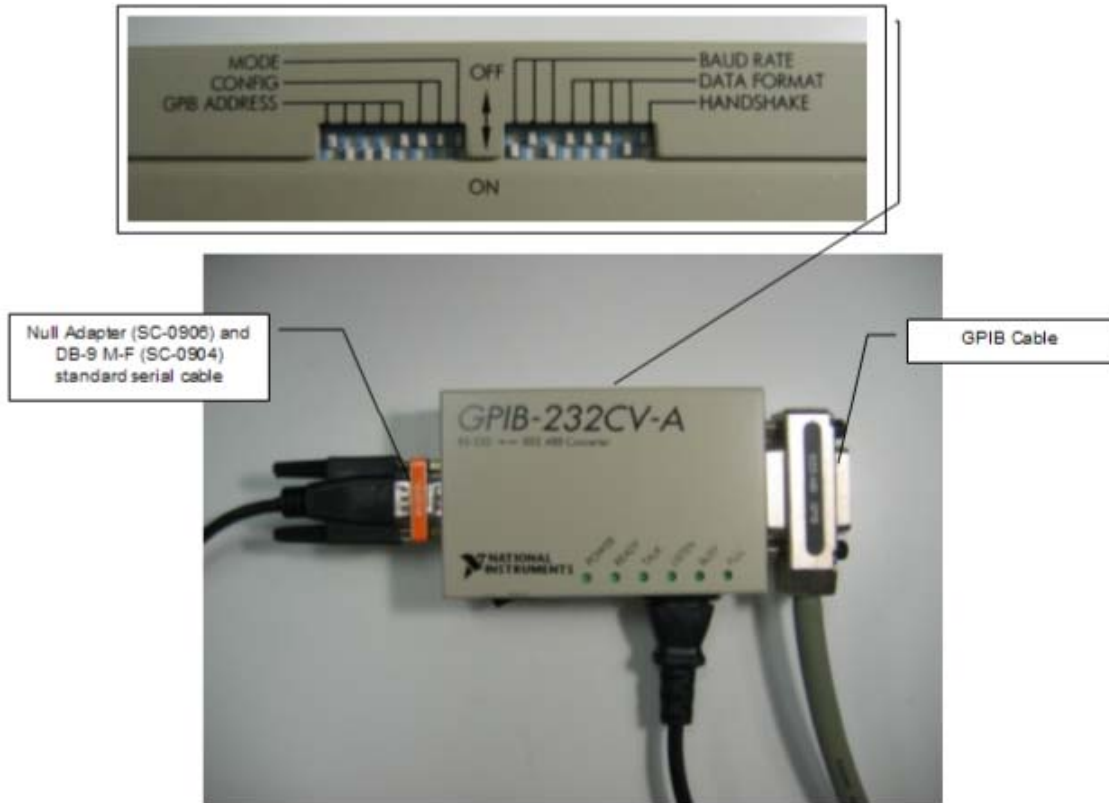


Figure 29: Dip Switch Settings to connect GPIB 232CV-A to DB9 on host computer.

### Hardware installation procedure:

- 1) Verify that the GPIB-232CV-A was originally configured for the autosampler. **Incorrect firmware will prevent proper installation.**
- 2) Remove the existing serial cable and replace with Null adapter (SC-0906) and DB9 M/F Serial Cable (SC-0904). See Figure 29: Dip Switch Settings to connect GPIB 232CV-A to DB9 on host computer.
- 3) Secure other end of Serial Cable (SC-0904) to a serial port on host computer.

## Using ICS 4894 with oneFAST (TN010608)

The ICS 4894 should be connected as shown in the attached Figure 30: Connections for ICS 4894.

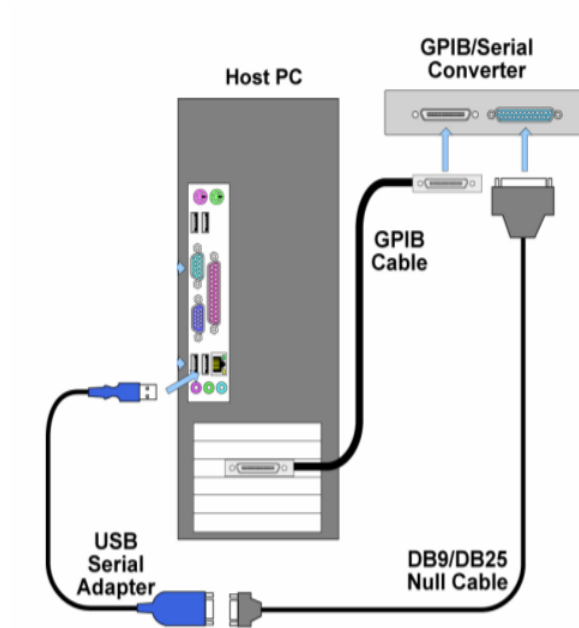


Figure 30: Connections for ICS 4894.

### Hardware installation procedure:

- 1) Remove serial cable between autosampler and GPIB Interface (SC-0901-14). Also remove any null adapter that may present.



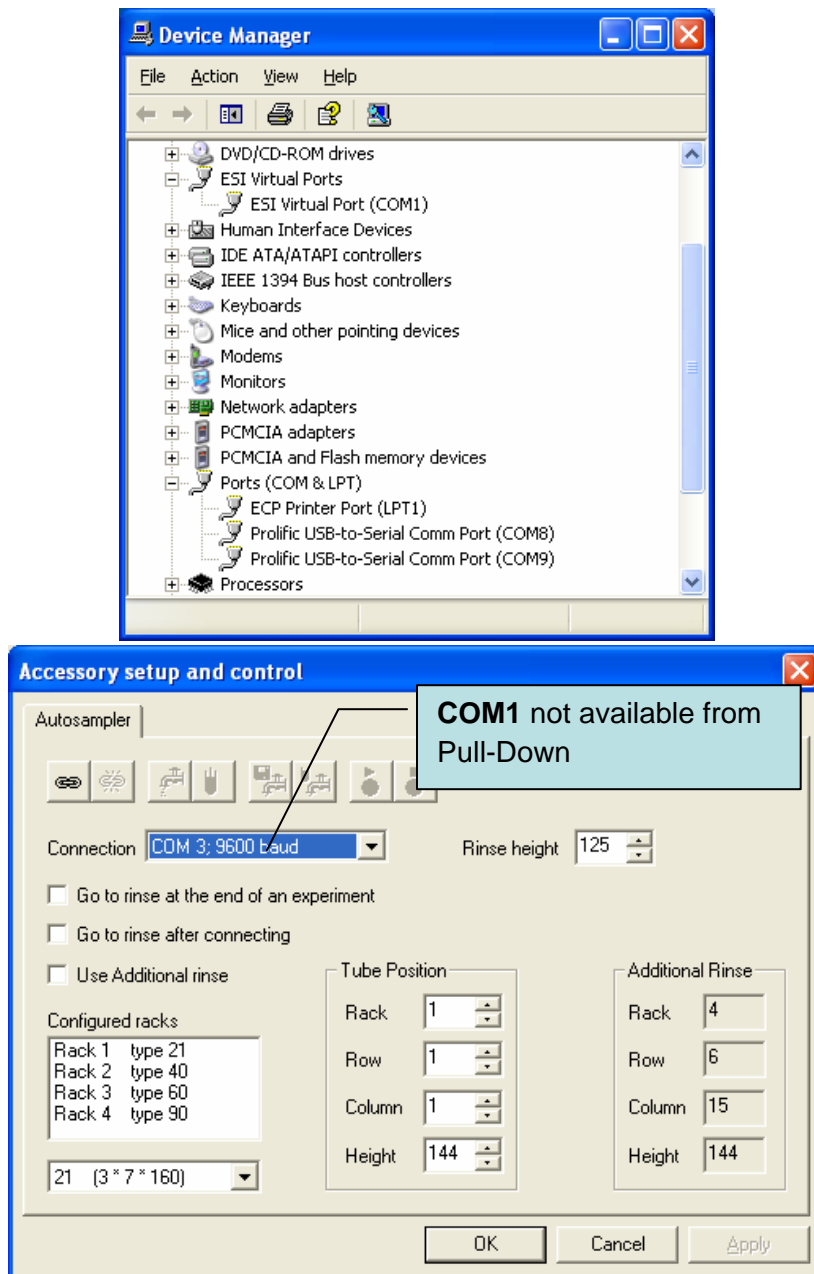
Please refer to Technical Note (TN290508) if the GPIB interface is a NI GPIB-232-CV-A.

- 2) Connect GPIB Interface to computer using a USB-Serial Adapter (SC-0905) and DB25/DB9 Null Cable (SC-0903).

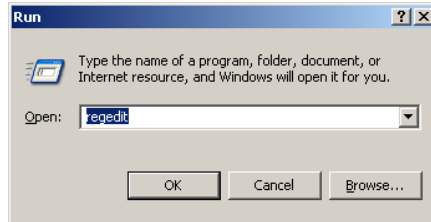
## Virtual Port not visible in PlasmaLab (TN040908)

Description: After the installation of oneFAST Software, the proper COM port is visible in the **Windows Device Manager** but not visible in the **Accessory setup and control window** of PlasmaLab.

- 1) Log onto the PlasmaLab computer with Administrator privileges and determine which ports need to be made available in the **Accessory setup and control window**.

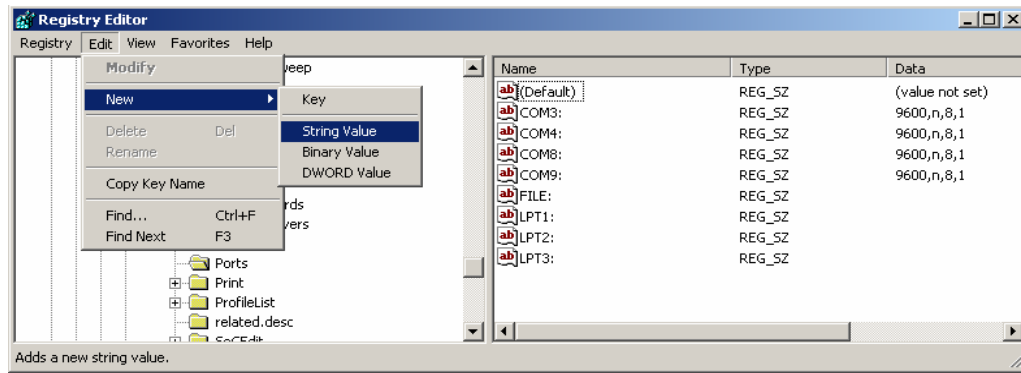


- 2) Run **regedit** as an administrator.

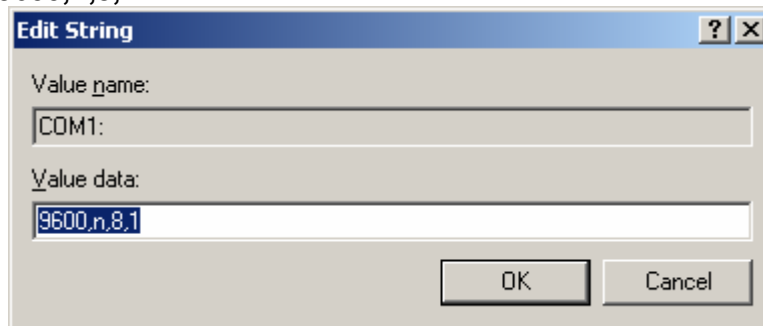


3) Navigate to: HKEY\_LOCAL\_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\Ports

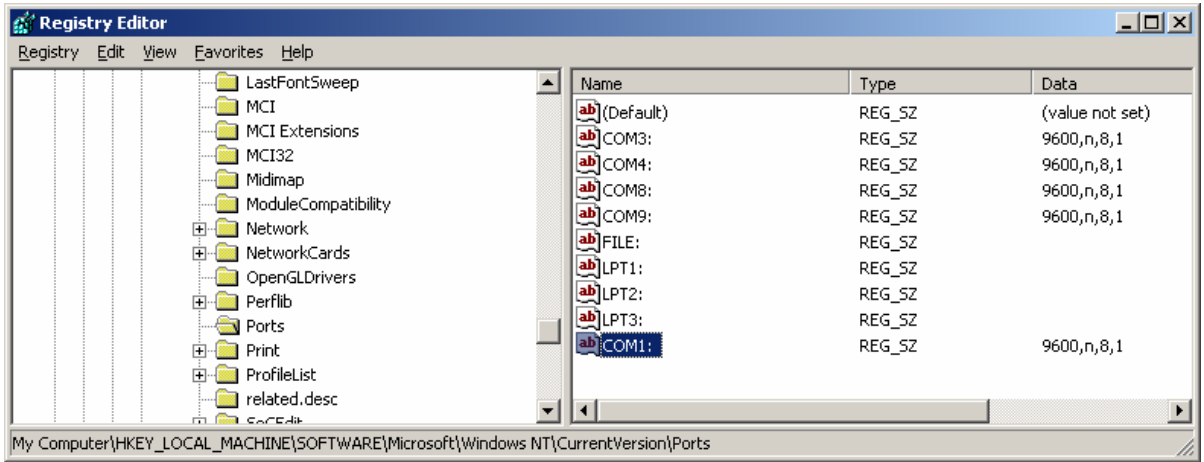
4) Add a new REG\_SZ entry for the virtual serial port (in this case, **COM1**):



5) Set the Data to be **9600,n,8,1**:



6) The Registry should now resemble the following window with the entry:



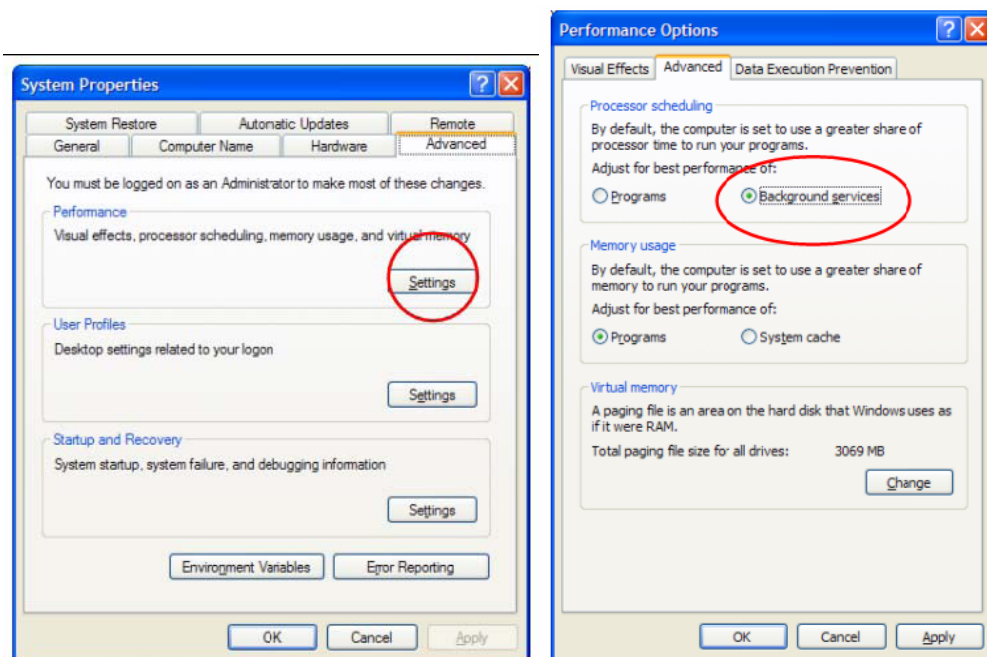
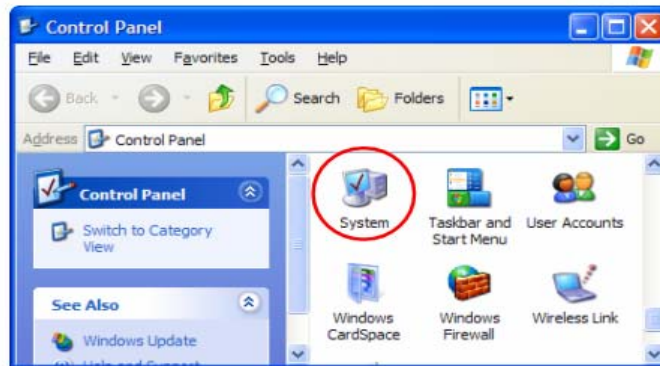


## Setting Background Services Priority (TN050808)

Depending on peripheral devices that are connected to computer, such as printers or USB connections, the following adjustment is recommended to improve communication performance.

The following step can be taken to correct the problem:

- Open **Control Panel>>System>>Advanced>>Performance Settings>>Advanced** and set the Processor scheduling to **Background services**. See Figures below.

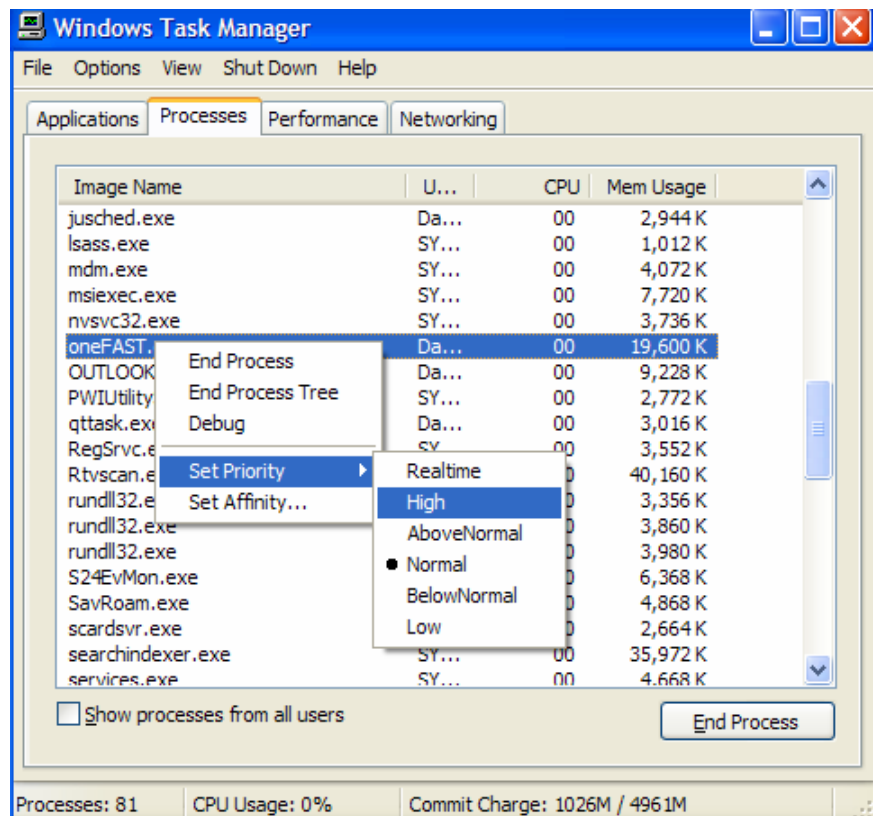


## Elevating Priority of oneFAST (TN061108)

Changing the priority of the oneFAST software may ease resource limitations of computer.

The following steps can be taken to test for the problem. The settings will revert to original settings at the next start of the oneFAST program.

- 1) After starting the oneFAST software, use **Ctrl-Alt-Del** to access the task manager and switch to the **Processes** tab.
- 2) Locate and right-click on the **oneFAST.exe** and select **Set Priority** and choose **High**.



- 3) Run oneFAST and evaluate. Note that this setting is maintained only until the oneFAST software is shut down.
- 4) If the application of this setting proves to resolve resource issues, the setting can be configured automatically through the use of a batch file. Please contact ESI support for assistance.