



**TRIAX Series Spectrometers**  
**TRIAX 180/190**  
**TRIAX 320**  
**TRIAX 550**

**Getting Started**

**Operation Manual**  
**Part number J81034 rev. B**



*Getting Started*

## **TRIAX Series Spectrometers**

**TRIAX 180/190  
TRIAX 320  
TRIAX 550**

Part Number 81034

Issued February 1999

This manual is intended to provide the first-time user with basic information and simple directions for the initial set-up and configuration of your TRIAX system. It is intended to be *supplementary* to the **TRIAX User Manual** that is included with the spectrometer. Please refer to the more comprehensive **TRIAX User Manual** for general operation instructions and details about the spectrometer.

## **Setting Up the TRIAX**

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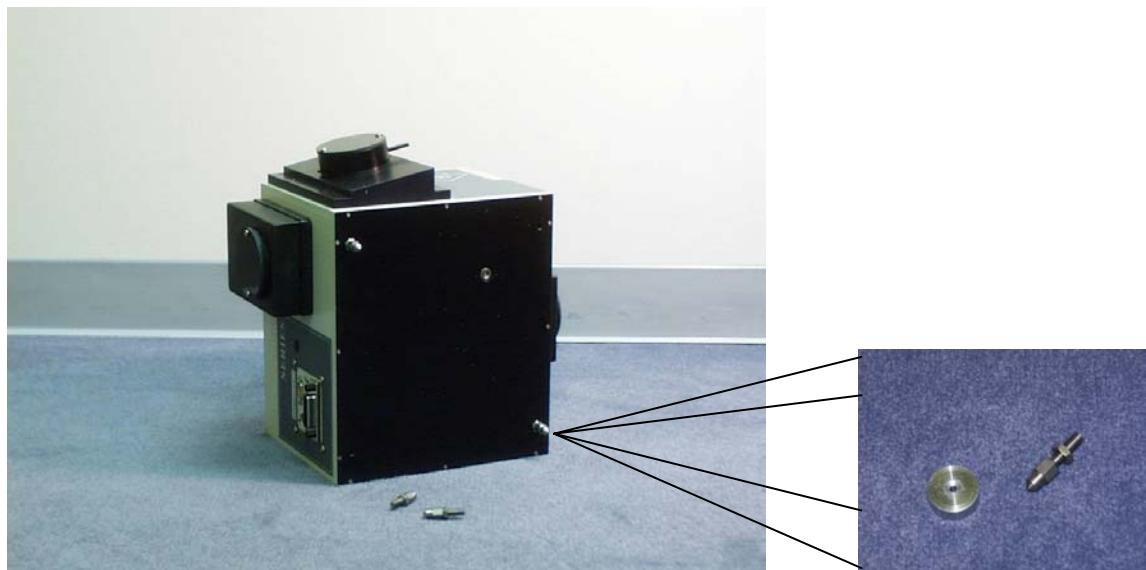
## **SETTING UP YOUR TRIAX:**

### ***Unpacking***

Visually inspect the containers your instruments are delivered in and if they appear to be damaged, refuse delivery from the shipper. If the containers are in good condition, then accept them from the shipper. Remove the TRIAX from the shipping container and place it on the bench where it will be used. Remove all of the cables and other accessories from the packaging and inspect all objects for any obvious shipping damage. Packing lists are provided to ensure that the correct parts have been included in your shipment.

### ***Leveling Feet***

Locate the leveling feet for the TRIAX and install them if not shipped on the instrument.

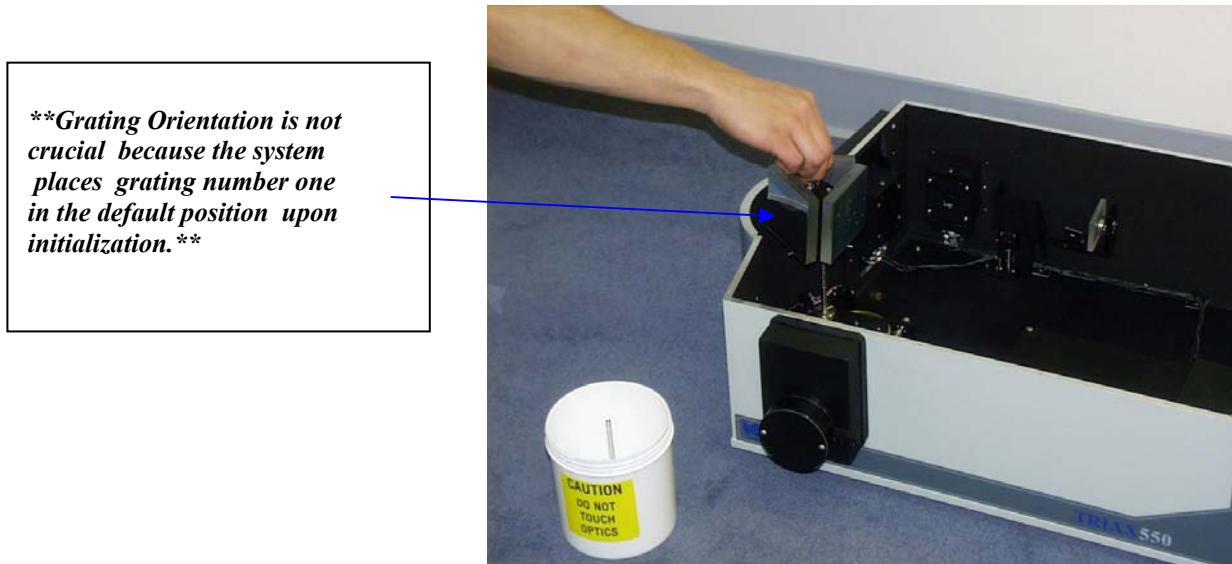


- The TRIAX 180/190 models have four leveling feet and four foot pads.
- The TRIAX 320 and TRIAX 550 models have three leveling feet and three foot pads.

## ***Installing the Grating Turret***

First open the lid by removing the lid screws on your TRIAX, then lifting the cover, front first, and setting it on the back edge of the instrument wall using the blocks attached to the back of the cover for the TRIAX 180/190 and the TRIAX 320 models. For the TRIAX 550 lift the cover and set it on the side wall of the instrument using the attached cover blocks.

*Caution: If your spectrometer has a side mirror, it is important to remove the mirror restraints (used for shipping protection) before powering-up.*



Grating groove densities and blazes are printed on a label attached to the rear of your TRIAX instrument. Also included on this label are the grating offsets. (See **TRAIX User Manual** for details about grating offsets)

***\*\*\*Use caution when handling the grating turret. Do not touch the optics.\*\*\****

## **Communications & Electrical Connections**

Locate the connector panel on the TRIAX and make the following connections (*With Power Off*):



### **RS-232 Communications**

- Connect one end of the cable, #400144, to the 9 pin male connector on the panel and the other end attaches to a COM port on your computer. [Note the COM port you attached to (eg. COM1 or COM2)]. If the COM port on your computer is 25 pins, then you have to attach the adapter, #973017 (9 to 25 pin adapter), to the #400144 cable and then to your computer.
- The 15 pin connector is only used if you have a motorized filter wheel to control from your TRIAX. If this is the case then connect one end of the CCA-FWTR to this panel and the other end to your motorized filter wheel.

### **IEEE488 Communications**

- Connect the IEEE488 cable between the National Instruments GPIB card in your computer and the TRIAX IEEE488 connector. (The TRIAX's default GPIB address is DEV1)

### **Power Connection**

- Attach the power adapter to the round connector on the panel *first* and *then* to the power outlet with a power cord.

**\*\*Caution: Never attach or remove this connector from the panel with power on.  
This may damage the spectrometer electronics.**

- To power-down the spectrometer, disconnect the power cord from the power adapter *only* or simply unplug the entire unit from the power outlet (wall socket).

## INITIALIZING YOUR TRIAX

*Using the Handscan (HS1000)*



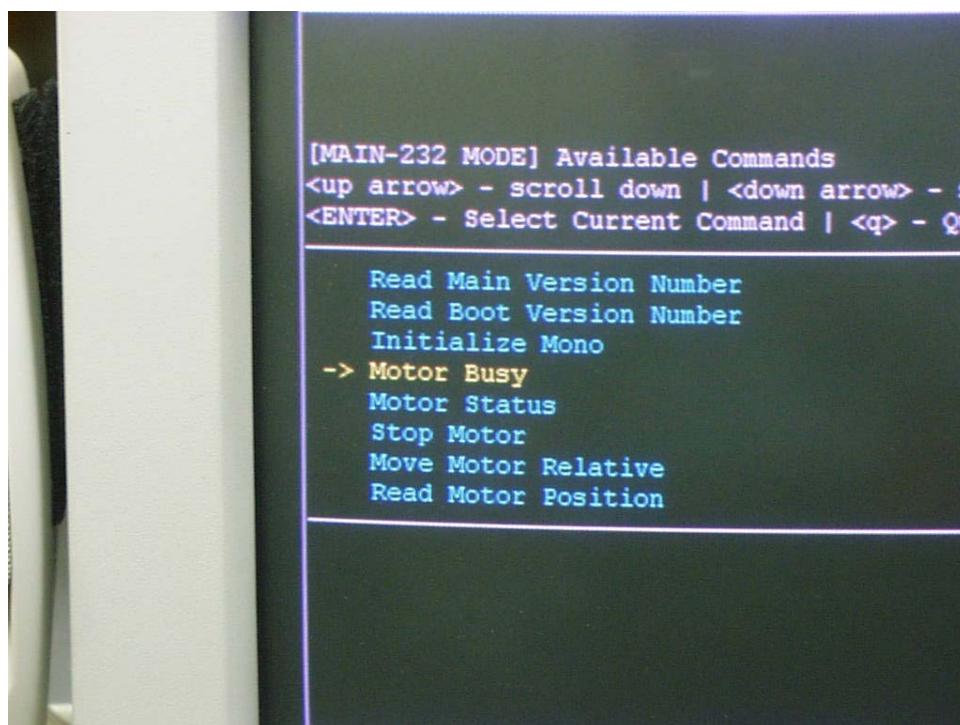
- Plug the HS1000 into the RS-232 port of your TRIAX using the cable #36406 and the #97134 adapter, if necessary.
- Plug in the Power Adapter for your TRIAX.
- The HS1000 goes through a self-test and then goes blank.
- Hit the “.” key and then **ENTER** on your HS1000 and your TRIAX will initialize.
- Follow the instructions in your HS1000 manual to use the Handscan.

## Using 232M DOS Program

- Using the 3 ½ inch diskette labeled “Datascan/Spex232/488 Support Diskette” go into the “Utility” directory and run the program “232M”. This program first prompts the user for the COM port the TRIAX is connected to and then the baud rate (19200).
- After hitting Enter, audible tones are heard and communication is established. The menu then appears, and choosing “Initialize Mono” initializes the TRIAX.
- The first portion of the initialization moves the drive and then initializes the slits (open and then closed.). After all the slits are initialized, the drive then finishes the initialization process by finding the “A” grating and putting it in Position 1.

The following is a listing of the pertinent commands and their functions:

|                                  |  |
|----------------------------------|--|
| <b>Initialize Mono</b>           | Initializes Monochromator  |
| <b>Move Motor Relative</b>       | Moves the Grating Motor in Steps<br>-Approx. 15 steps/nm for 1200gr/mm grating in the TRIAX 180/190 and the TRIAX 320 <i>without</i> micro-stepper option (MDO-TM);<br>-Approx. 500 steps/nm for 1200 gr/mm grating in the TRIAX 320 <i>with</i> micro-stepper option (MDO-TM) and all TRIAX 550's |
| <b>Read Motor Position</b>       | Reads Motor Position in Steps  |
| <b>Slit Move Relative</b>        | Moves the Slit in Steps (Approx. 2 microns per step)   |
| <b>ABS Mono Move</b>             | Moves the Motor in Wavelength (nm) [Based on 1200gr/mm grating (eg. 546nm for a 600 gr/mm grating = 273nm in this section)]  |
| <b>Set Index Device Position</b> | Changes gratings: The answer to the first three prompts is zero (0), then the Last Prompt, “device position”, is as follows:<br>0 - grating one (default grating)<br>1 - grating two<br>2 - grating three  |
| <b>Set Entrance Mirror</b>       | Moves the Entrance Mirror to the front and side positions  |
| <b>Set Exit Mirror</b>           | Moves the Exit Mirror to the front and side positions  |



## ***Using SpectraMax™ for Windows® (CSW-SMW)***

- Install your software by putting Disk 1 of your Software disks into the drive and run the SETUP program.
- Follow the “on screen” directions, and refer to your Software Manual if you have any questions.
- The software prompts you for the Communication Type and Channel of your Instruments (be sure to know which COM port or IEEE488 device address your instrument is connected to on your computer before starting).
- When finished installing, run the software using the “Default Layout”.

### ***\*\*\*Important Files\*\*\****

The following files in the SpectraMax™ for Windows® software contain important configuration parameters and can be edited to your specifications.

All of these files are located in the **Sptwmax\Isa\_ini** directory.

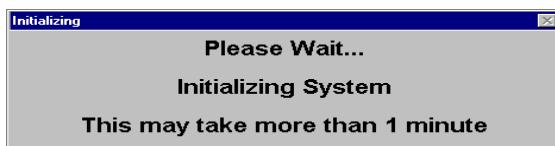
- **SAQ.INI** – This file contains the communication type (IEEE488 or RS232), and the channel # (COMxx or DEVxx) for your TRIAX.
- **DS1010.INI** – This file contains the communication type (IEEE488 or RS232), and the channel # (COMxx or DEVxx) for your Datascan. [If one was ordered]
- **LOCKIN.INI** – This file contains the communication type (IEEE488 or RS232), and the channel # (COMxx or DEVxx) for your Lockin Amplifier. [If one was ordered]
- **SAQ2.INI** – This file contains the communication type (IEEE488 or RS232), and the channel # (COMxx or DEVxx) for your Lockin Amplifier. [If one was ordered]

Below are two screens you may see during the initialization process. The Initialization screen will be seen every time you initialize communications between the spectrometer and the software. If there is a communications problem, then the second screen will appear giving details of the device problem.

*Note: If you have continuing communications problems, refer to the TRIAX manual for more detailed information or contact your local Instruments SA service provider.*

## Initialization

- Once a Layout File is chosen, SpectraMax will attempt to establish communications and initialize every device listed in the Layout file



## Communications Problem - Smart Start

- If SpectraMax can not communicate with a specific device, it will display a window showing which device and allow for the user to modify the communications settings or emulate the device (if possible).
- If Communication settings are modified, the software will retry. Upon successful communication, the settings for that device will be updated.



## Controllers

### **DATA SCAN 2 (DS1010)**

The Data Scan is a controller used primarily for data acquisition when purchased with a TRIAX. It is capable of having two current or voltage inputs and can also be ordered with a high voltage supply for Photo Multiplier Tubes (PMT's). The DS1010 is also capable of driving a filter wheel and supplying a  $\pm 15$  volt bias for solid state detectors.



#### **RS-232 Communications**

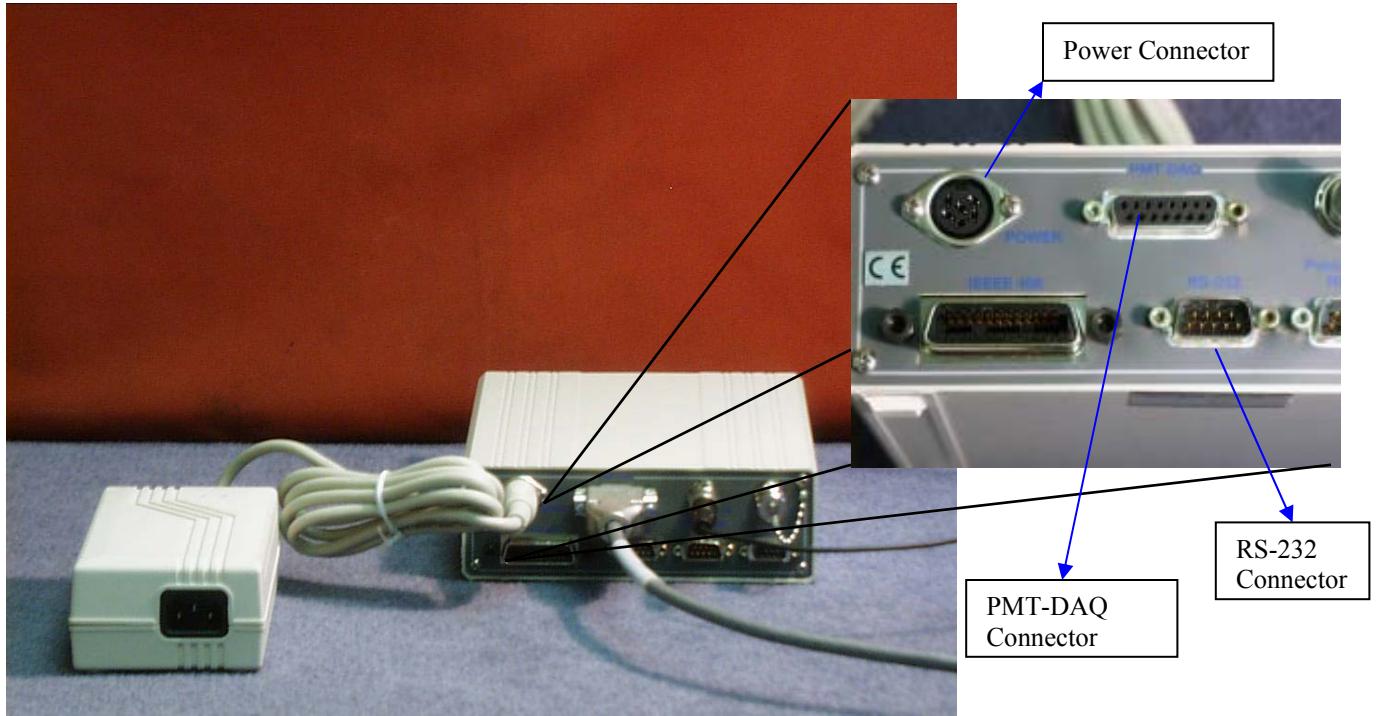
- *With power off*, connect one end of the cable #97133 to the 25 pin male connector on the DS1010 panel and the other end attaches to a COM port on your computer. [It is important to remember the COM port you attached to (eg. COM1 or COM2)!]. If the COM port on your computer is a nine pin, then you have to attach the cable adapter #97134 (25 to 9 pin adapter), to the #97133 cable and then to your computer.

#### **IEEE488 Communications**

- *With power off*, connect the IEEE488 cable between the National Instruments GPIB card in your computer and the Data Scan IEEE488 connector.  
(The Data Scan's default GPIB address when ordered with a TRIAX is DEV2).

## **SPECTRACQ 2**

The SpectrAcq2 is an acquisition box capable of one current or one voltage input and, when ordered with a DM302 module, can be used for Photon Counting. It is also capable of supplying the bias voltage for a solid state detector or the bias for a PMT that contains an internal high voltage supply (eg. DPM-HV).



### **RS-232 Communications**

- *With power off*, connect one end of the cable #40144 to the 9 pin male connector on the SpectrAcq2 panel and the other end attaches to a COM port on your computer. [It is important to remember the COM port you attached to (eg. COM1 or COM2)!]. If the COM port on your computer is a 25 pin, then you have to attach the adapter #973017 (9 to 25 pin adapter), to the #40144 cable and then to your computer.

### **IEEE488 Communications**

- *With power off*, connect the IEEE488 cable between the National Instruments GPIB card in your computer and the SpectrAcq2 IEEE488 connector.  
(The SpectrAcq2's default GPIB address when ordered with a TRIAX is DEV3).

### **PMT-DAQ**

- Using various cables provided, this connector supplies the bias for solid state detectors and for self-contained high-voltage PMT's. This connector also provides software control for the setting of the high voltage on a self-contained-high-voltage PMT and the external stand alone High Voltage Supply from ISA (PMT-HVPS). When ordered for photon counting, the signal from the DM302 module is also input into this connector.

## **Accessories**

### ***FILTER WHEEL***

The AFW-C6P and AFW-C6PM are general purpose six position filter wheels. The AFW-C6PM includes a motor and electronics for remote control.



#### ***Controlling the AFW-C6PM through a TRIAX***

- Connect one end of cable #CCA-FWTR to the TRIAX electronics control panel, labeled ***Filter Wheel***. Connect the other end of this cable to the Filter Wheel 9 pin connector.

#### ***Controlling the AFW-C6PM through a DS1010 (Datascan 2)***

- Connect one end of cable #CCA-JYM to the DS1010 electronics control panel, labeled ***Mono Drive 1***. Connect the other end of this cable to the Filter Wheel 9 pin connector.

#### ***Controlling the AFW-C6PM through a Filter Wheel Control Box***

- Connect one end of cable #35506 to the Filter Wheel control box electronics control panel, labeled ***Spectrometer Power***. Connect the other end of this cable to the Filter Wheel 9 pin connector.

#### ***Attaching the Filter Wheel to TRIAX Slits or Sample Compartment***

- Attach part #36540, M28 slit adapter, to the slit or port of the sample compartment where the Filter Wheel is to be attached using two 6/32" cap head screws.
- Simply screw the Filter Wheel to the M28 adapter using the M28 Knurl Nut attached to the Filter Wheel cover.

## ***CHOPPER***

The ACH-C Optical Chopper is a general-purpose optical chopper designed for laboratory use. The unit may be phased-locked to either its own internal clock generator or a user-supplied external clock.



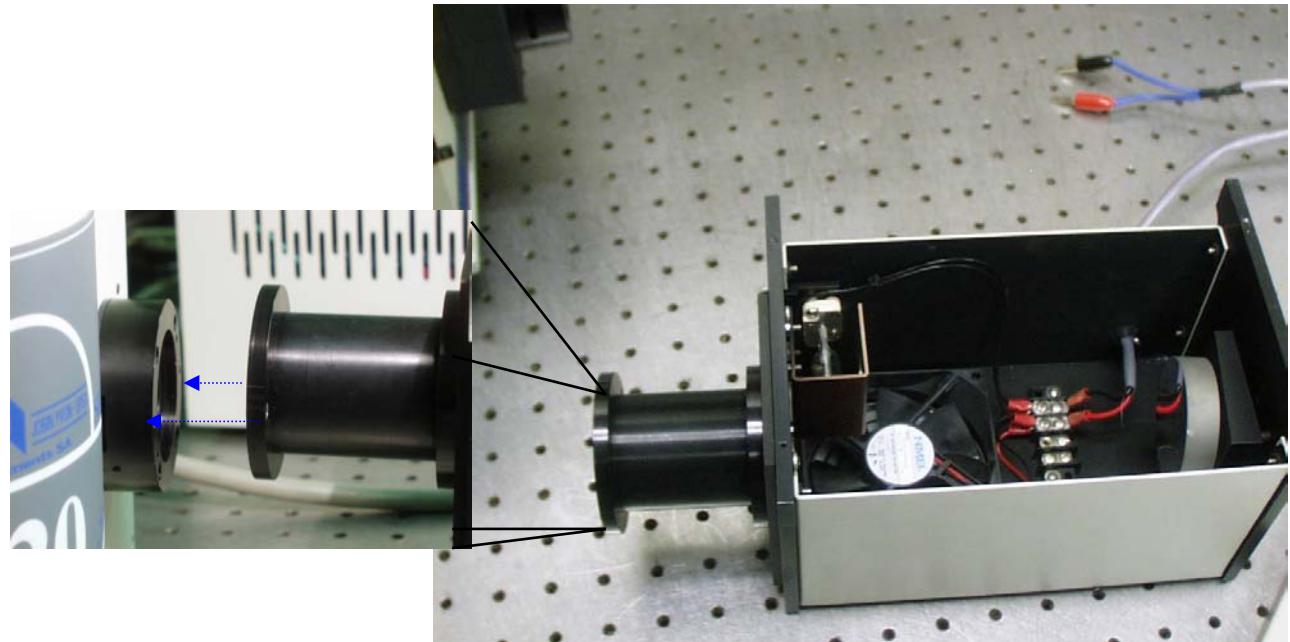
### ***Attaching the Chopper to TRIAX Slits or Sample Compartment***

- Attach part #36540, M28 slit adapter, to the slit or port of the sample compartment where the Chopper is to be attached using two 6/32" cap head screws.
- Simply screw the Chopper to the M28 adapter using the M28 Knurl Nut attached to the Chopper cover.

***Note: When using the 3 blade wheel, the chopper cannot be used in the High-Speed mode.***

## **LSH-SERIES LAMP HOUSINGS**

The LSH-T100 and LSH-T250 lamp housings are tungsten light sources of 100 and 250 watts, respectively. The design allows the housing to easily be mounted to a spectrometer. Forced air cooling is provided for both housings.

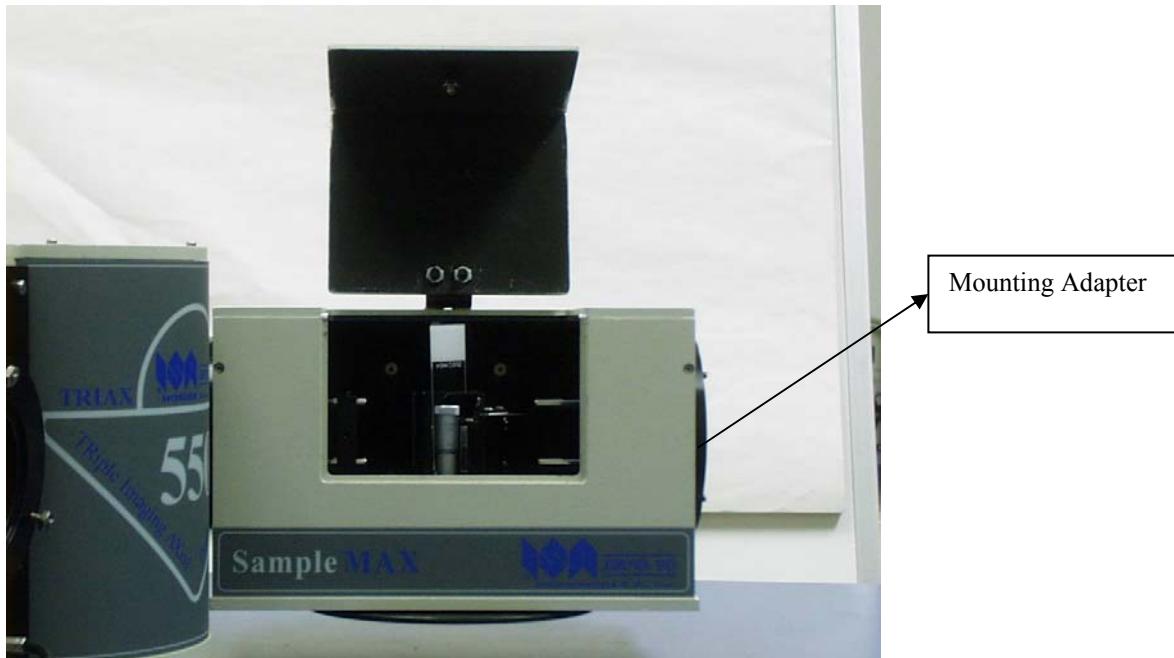


### ***Attaching the LSH-Series Lamp Housings to TRIAX Slits or Sample Compartment***

- Simply screw the Lamp Housing to the TRIAX Slits or Sample Compartment using two 6/32" cap head screws.

## ***UNIVERSAL SAMPLE COMPARTMENT (SampleMax)***

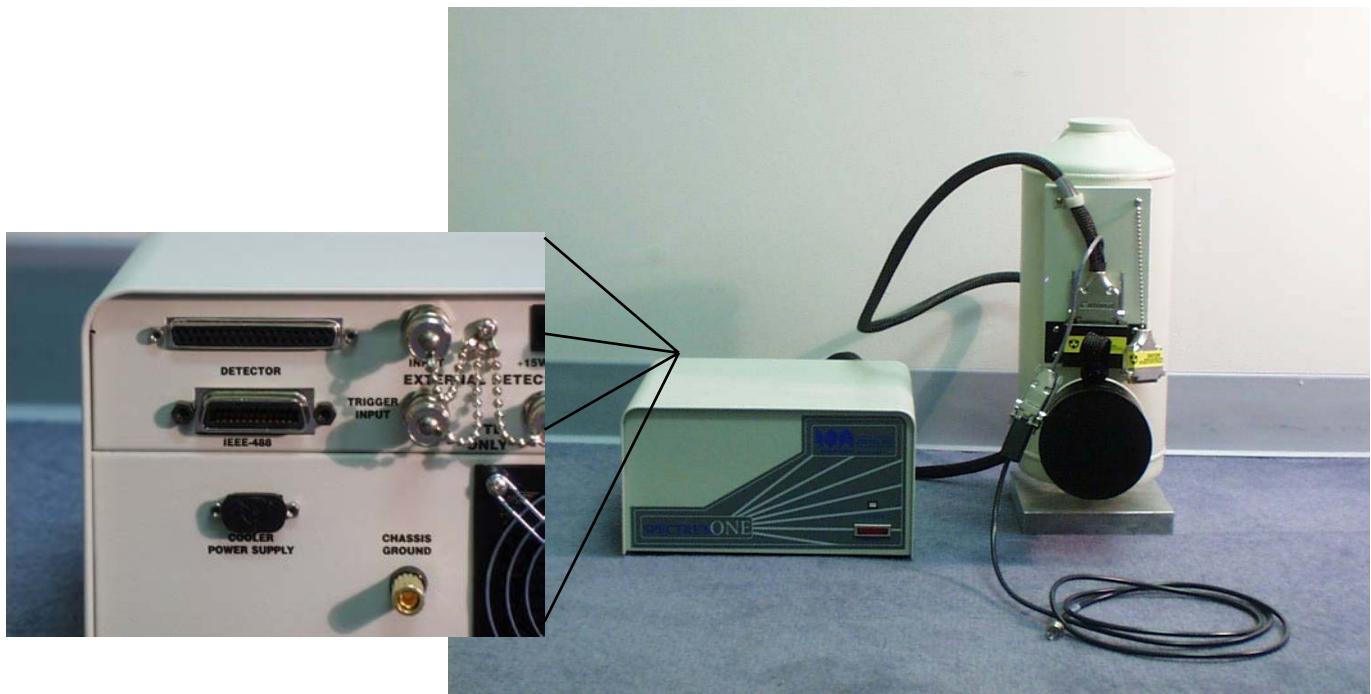
The SampleMax is a compact, state-of-the-art, universal sample compartment. The SampleMax offers a wide selection of interchangeable optics for operation in the Visible, UV, and IR.



### ***Attaching the Sample Compartment to TRIAX Slits***

- Remove the Sample Compartment cover to access the four screws that secure the Mounting Adapter to the wall of the Sample Compartment.
- Remove the Mounting Adapter.
- Using two 6/32" cap head screws, secure the Mounting Adapter to the TRIAX Slits.
- Using the four screws previously removed, re-secure the Mounting Adapter to the Sample Compartment.

## CCD 3000



- *With power off*, connect the cable #35872 into the CCD 3000 controller 37 pin connector labeled **Detector**, and then to the CCD head.
- *If you have a TE cooled head*, connect the cable #37661 into the CCD 3000 controller connector labeled **Cooler Power Supply**, then to your CCD head.
- Connect the cable #36217 to the BNC connector on the exit port of your TRIAX and the other end to the cable #35872.
- Connect the IEEE488 cable to the National Instruments card in your PC and to your CCD 3000 controller.

Run your SpectraMax™ for Windows® software and monitor the CCD temperature in the Visual Instruments Setup Menu. Once your CCD reaches operating temperature (this temperature is reflected in the **Spectrum One User Manual** for each CCD type), it can then be operated normally.

# **HORIBA**

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[Design Concept]

The HORIBA Group application images are collaged in the overall design.  
Beginning from a nano size element, the scale of the story develops all the way to the Earth with a gentle flow of the water.



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