SAD500 Serial Port Interface

The **SAD500 SERIAL PORT INTERFACE** is a microprocessor-controlled A/D converter for serial port connection or stand-alone operation. It can be used to interface to desktop or portable PCs, PLCs, and other devices that support the RS-232 communication protocol. Directions for setting up your SAD500 follow. Because A/D converter installation goes hand-in-hand with software installation, directions for installing OOIBase32 Spectrometer Operating Software are also included.

Interface the SAD500 to your PC

1. If you ordered your SAD500 mounted onto your spectrometer, simply connect the 6-pin DIN end of the serial cable to the SAD500 and the DB9 end to your PC. If you ordered your SAD500 in its own housing, attach the 25-pin conductor ribbon cable from the spectrometer to the SAD500. Then connect the 6-pin DIN end of the serial cable to the SAD500 and the DB9 end to your PC.
2. For either configuration, note the serial port number (also called COM Port) on the PC to which you are interfacing. (Older PCs may not have numbered ports.)
3. Plug the +12VDC wall transformer into an outlet and connect it to the SAD500.

Install OOIBase32

Before installing OOIBase32, make sure that no other applications are running.
1. Execute **Setup.exe**. At the "Welcome" dialog box, click **Next>**.
2. At the "Destination Location" dialog box, accept the default or choose **Browse** to pick a directory. Click **Next>**.
3. At the "Backup Replaced Files" dialog box, select either **Yes** or **No**. We recommend selecting Yes. If you select Yes, accept the default or choose **Browse** to pick a destination directory. Click **Next>**.
4. Select a Program Manager Group. Click **Next>**. At the "Start Installation" dialog box, click **Next>**.
5. Follow all prompts regarding the Spectrometer Configuration diskette that came with your system. For more on the Spectrometer Configuration diskette, see the **Note** below. (If you downloaded OOIBase32 from the Ocean Optics web site, you will not have this diskette. Select **No** when first asked about the diskette.)
6. At the "Installation Complete" dialog box, choose **Finish>**. **Restart your computer**, when prompted.

   Note:
   In your spectrometer shipment box, you received a Wavelength Calibration Data Sheet wrapped around a floppy diskette. The Wavelength Calibration Data Sheet and the spectrometer configuration file on the floppy diskette contain the same information, which is unique to your spectrometer. When you install OOIBase32, you are prompted to insert this diskette into your computer so that this data is installed with the software. However, if the diskette is ever lost, or if you downloaded OOIBase32 from the our web site and did not receive a diskette, you can use the data on the Wavelength Calibration Data Sheet to enter into OOIBase32 fields.

Run OOIBase32

After you restart your computer, navigate to the OOIBase32 icon and select it. The first time you run OOIBase32 after installation, you must follow several prompts before you can begin taking measurements.

Operator and Serial Number Dialog Box
First, a prompt to enter a user name and serial number appears. Certain data files will include this information in the header. (If, at a later date, you wish to change the operator name and serial number, select **Edit | Settings** from the menu and then choose the **Registration** tab.) Click **OK**.

Default Spectrometer Configuration File

Next, the following message appears:

> This appears to be the first time OOIBase32 has been executed. Please select a spectrometer configuration file from the following screen. This spectrometer configuration file will be used each time OOIBase32 is started.

A file open dialog box then appears. Navigate to the OOIBase32 directory, and choose the default spectrometer configuration file -- the file with **.spec** as the extension, preceded by the serial number of your spectrometer. (A default spectrometer configuration file will be named something similar to **I2J613.spec**.)

Configure Hardware Dialog Box

Next, the **Configure Hardware** dialog box opens. The parameters in this dialog box are usually set only once -- when OOIBase32 is first installed and the software first runs.

1. Under **Spectrometer Type**, choose your spectrometer.
2. Under **A/D Converter Type**, choose SAD500.
3. Under **Serial Port**, choose the COM port number your computer is using to interface to your SAD500. See the **Troubleshooting** section to determine the COM Port.
4. Under **Baud Rate**, select the speed at which the SAD500 will operate. (We recommend using 115,200 baud rate.)
5. Under **SAD Pixel Resolution**, enter resolution values from 1 to 500. This value specifies that every n^{th} pixel of the spectrometer is transmitted from the SAD500 to the PC. Your resolution value depends on your experiment. By sacrificing resolution, you gain speed. The transfer of one complete spectra requires ~0.4 seconds when communicating at 115,200 baud rate. If you need your information in <0.4 seconds, increase the resolution or enable data compression (see below).
6. Enable the **Compress SAD500 Data** function to minimize the amount of data transferred over the RS-232 connection. Transmission of spectral data over the serial port is a relatively slow process. Enabling this function ensures that every scan transmitted by the SAD500 will be compressed, greatly increasing the data transfer speed of the SAD500.
7. For your setup, only these parameters apply to your system. (Ignore the other settings; they apply to other A/D converters.) Click **OK**. You can always change these settings once OOIBase32 is fully operational by selecting **Spectrometer | Configure | A/D Interface**.
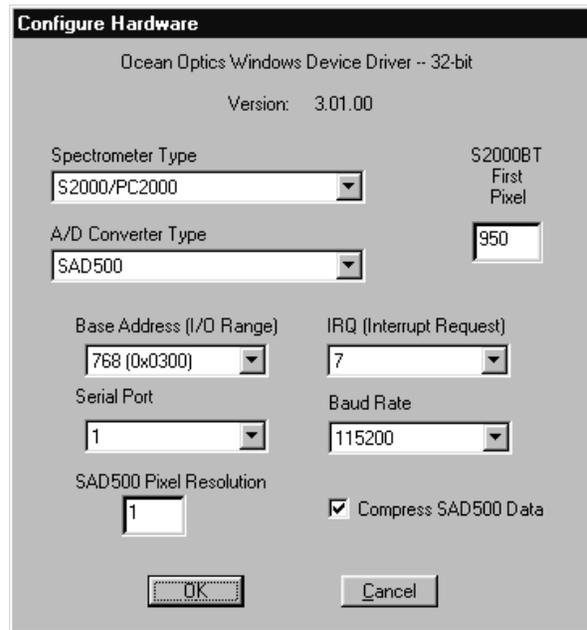
☞ If you do not see the "Configure Hardware" screen, exit the software. Then select **Start** | **Run**, and type `C:\windows\ooidrv.ini` for Windows 95/98 systems or `c:\winnt\ooidrv.ini` for Windows NT systems. Notepad will open. Edit this file for our device driver by finding the "Initialized" entry and making sure this line reads `Initialized=0`. Save the OOIDRV.INI file and exit Notepad. Restart OOIBase32. You should now see the "Configure Hardware" dialog box.

Spectrometer Configuration Dialog Box

Now that OOIBase32 is running, you need to configure your system. Select **Spectrometer | Configure** from the menu. Go through each page in the **Spectrometer Configuration** dialog box to set system parameters. (See the **OOIBase32 Spectrometer Operating Software Manual** for details.)

♦ In the **Wavelength Calibration** page, the coefficients for each spectrometer channel in your system have already been loaded as part of the spectrometer configuration file that came on a floppy diskette with your spectrometer. (See the **Note** on page 1.) If you did not receive this floppy diskette, you can enter the wavelength coefficients of your system from the Wavelength Calibration Data Sheet that came with your spectrometer. Check the **Enabled** box for each spectrometer channel in your system.

♦ In the **A/D Interface** page, enter the same settings and values as you did in the **Configure Hardware** dialog box.

♦ The **Detector Linearity** page in this dialog box allows you to enter coefficients for an algorthim that corrects for rare occurances of non-linearity of the detector. Contact an Applications Scientist at Ocean Optics for more information.
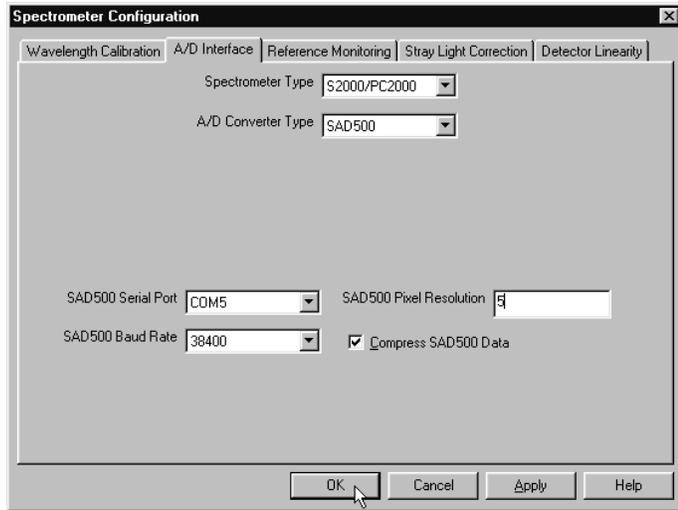
Save the spectrometer configuration file by choosing **Spectrometer | Save Configuration As** from the OOIBase32 menu. You can rename the file or use the default file name (**[your serial number].spec**). You will then be asked if you would like to make this file the default spectrometer configuration file. Choose **Yes**. The next time you run OOIBase32, the software will use the file as the standard for your configuration. When you exit OOIBase32, any changes to the configuration file will be automatically saved to the default file.

OOIBase32 Settings Dialog Box

At this point, it is a good idea to configure several OOIBase32 operation parameters. Choose **Edit | Settings** from the menu to open the **OOIBase32 Settings** dialog box. Go through each page of this dialog box to select options for saving, opening, and printing data; to configure default setting files; and to select other important options such as storing and copying data and choosing warning messages. (See the **OOIBase32 Spectrometer Operating Software Manual** for details.)

Configure Data Acquisition Dialog Box

Finally, select **Spectrum | Configure Data Acquisition** from the menu to set your data acquisition parameters in the **Configure Data Acquisition** dialog box. The **Basic** page allows you to set the integration time and choose averaging and boxcar smoothing values. The **External Trigger** page allows you to specify the external trigger mode. The **Strobe** page allows you to control external strobe events with the spectrometer. (See the **OOIBase32 Spectrometer Operating Software Manual** for details.)

Specifications

A/D resolution:	12-bit
A/D sampling frequency:	500 kHz (maximum)
Communication port:	RS-232
Baud rate:	2400-115,200
Input voltage:	10 – 24V
Input current:	130 mA without spectrometer
Interface cable:	6-pin DIN connector to PC, 25-pin connector to spectrometer
Multiple-channel capability:	supports up to 8 spectrometer channels
Spectrometer integration time:	5 milliseconds to 60 seconds (S2000 spectrometers)

Troubleshooting

Occasionally, there will be problems associated with your PC configuration and the software. Here are a few tips to assist you.

♦ To ensure that the software and hardware are in-synch, exit OOIBase32, cycle power on the SAD500, and restart OOIBase32.

♦ In Windows 95/98, you can find out your Serial Port number by selecting **Start | Settings | Control Panel.** Then double-click on the **System** icon and select the **Device Manager** tab. Double-click on **Ports (COM & LPT)** to display the COM port numbers. Ensure that there is no yellow or red warning sign next to the COM Port you are attempting to use.

♦ If the ports on your PC are not labeled and you don't know which COM port you are using for your SAD500, you may have to resort to trial and error. If you choose the wrong serial port number, you will not see a dynamic trace responding to light near the bottom of the displayed graph. Instead, you will see a straight line.

♦ On some computers, users may have to disable any virus protection software to ensure timely and complete transfer of the data.