

USB-AOUT

Analog Output Module

Installation and Operation Instructions

Description

The USB-AOUT is a digital-to-analog accessory that connects directly to the 10-pin input connector on the Ocean Optics USB2000 Spectrometer. It emits an analog current ranging from 4 to 20 mA (based on a user-configurable scale) from Pin 8 of its 10-pin output. The analog current varies based on a specific wavelength intensity obtained from OOIBase32 Spectrometer Operating Software. The USB-AOUT does not require an external power supply, as the USB2000 Spectrometer powers the unit via the 10-pin connector.

The USB-AOUT is an ideal solution for system integration configurations. It is designed to be a custom configurable trigger mechanism based on current levels. You must configure the specific events to be triggered separately in your configuration.



Parts Included

The USB-AOUT ships with the following items:

- USB-AOUT digital-to-analog output module
- Thumbscrew (to secure the USB-AOUT to the USB2000 Spectrometer)

Using the USB-AOUT

The following sections provide instructions on setting up and using the USB-AOUT.

Connecting the USB-AOUT

► Procedure

Follow the steps below to configure the USB-AOUT:

1. Remove the USB-AOUT and thumbscrew from the product packaging.
2. Screw the thumbscrew into the metal connector located under the 10-pin output of the USB-AOUT.
3. Connect the 10-pin input connector of the USB-AOUT to the 10-pin connector on the USB2000 Spectrometer and secure the USB-AOUT using the thumbscrew.
4. Connect the fiber, USB cable, etc. to the USB2000 Spectrometer as you normally would.
5. Connect the appropriate detection mechanism to Pin 8 of the 10-pin output connector on the USB-AOUT.
6. Connect the ground wire to Pin 6 of the 10-pin output connector on the USB-AOUT.

You have now connected the USB-AOUT for operation.

Configuring the USB-AOUT in OOIBase32

The OOIBase32 operating software allows you to customize the intensities that produce certain current levels in the USB-AOUT. This is achieved by configuring the USB-AOUT in the Time Acquisition Channels configuration dialog box in OOIBase32. Using this feature in OOIBase32, you can customize the USB-AOUT so that it outputs a current that scales (with a maximum output of 20 mA, based on intensity) at the desired wavelength.

For specific instructions on using OOIBase32, consult the OOIBase32 manual at the following web address:

<http://www.oceanoptics.com/technical/ooibase32bit.pdf>

► Procedure

Follow the instructions below to configure the USB-AOUT options in the Time Acquisition dialog boxes of OOIBase32:

1. Ensure that OOIBase32 is in the desired mode of operation.
2. Open the Time Acquisition Channel Configuration dialog box (see the OOIBase32 manual for specific instructions).
3. Select the Channel Tab associated with the USB-AOUT-equipped spectrometer.
4. Select the Enable button to enable Time Acquisition on the channel tab.
5. Select the Enable D/A Output (Channel X) check box on the channel tab.
6. Specify the wavelength you wish to monitor in the Wavelength (nm) box.

7. Enter the number of pixels surrounding the monitored wavelength to include in the Time Acquisition process (if desired) in the Bandwidth (pixels) box.
8. Once these options are configured, proceed to [Setting the Dynamic Detection Range of the USB-AOUT](#) section below for instructions on customizing the current output scale.

Setting the Dynamic Detection Range of the USB-AOUT

Once you configure the Time Acquisition options, you must configure the dynamic range of the analog output. By using the Offset and Factor boxes, you can customize the current output so that the final output is between 4-20 mA.

- In Scope Mode, OOIBase32 outputs wavelength intensity based on a 0-4095 count scale.
- In Absorbance Mode, OOIBase32 outputs wavelength intensity based on an absorbance scale of 0-4.
- In Transmission Mode, OOIBase32 outputs wavelength intensity based on a 0-100 percent scale.
- Relative Irradiance mode is a customized mode where you can determine the output scale of OOIBase32.

► Procedure

Follow the instructions below to scale the data for your mode of operation:

1. Specify the low limit of your expected data range for the offset in the Offset box of the Time Acquisition Channel Configuration dialog box.

For example, if you are in Scope Mode and wish to monitor intensity from 350-3500 counts, enter 350 for the offset. If you are in Transmission mode and wish to use 20% for the low threshold, enter a 20 for the offset, etc.

2. Calculate the factor for the Factor box of the Time Acquisition Channel Configuration dialog box. Factor calculation is determined by the expected upper threshold of your measurement and by the mode you are in. Calculate the factor using the following equation:

$$\text{Factor} = 5 / (\text{Upper Threshold} - \text{Lower Threshold})$$

Absorbance Mode Example

If you are in Absorbance Mode and wish to scale the 4-20 mA output for absorbance measurements between 1.5 and 3.5, calculate the factor as follows:

$$\text{Factor} = 5 / (3.5 - 1.5) \text{ or } \text{Factor} = 5 / 2$$

Thus, for this particular Absorbance Mode experiment, the Factor should be equal to 2.5.

Transmission Mode Example

If you are in Transmission Mode and wish to scale the 4-20 mA output between the values of 15% and 95%, calculate the factor as follows:

$$\text{Factor} = 5 / (95 - 15) \text{ or } \text{Factor} = 5 / 80$$

Thus, for this particular Transmission Mode experiment, the Factor should be equal to .0625.

Scope Mode Example

If you are in Scope Mode and wish to scale the 4-20 mA output for Scope Mode intensities between 1000 and 3500:

$$\text{Factor} = 5 / (3500 - 1000) \text{ or } \text{Factor} = 5 / 2500$$

Thus, for this particular Scope Mode experiment, the Factor should be equal to .002

3. Click the **Apply** button to set the values, and then click the **OK** button to close the Time Acquisition Channel Configuration dialog box.

You have now configured the USB-AOUT scale to output 4-20 mA based on the appropriate intensity scale for your mode of operation.

USB-AOUT Specifications

USB-AOUT Pinout Information

The following section contains information on the 10-pin output connector on the USB-AOUT.

10	8	6	4	2
9	7	5	3	1

Pinout Diagram of the 10-Pin Output Connector on the USB-AOUT

Pinouts

Pin	Function
1	V _{USB} or 5V in
2	RS232 Tx
3	RS232 Rx
4	Lamp Enable
5	Continuous Strobe
6	Ground
7	External Trigger In
8	Signal Output (4-20 mA)
9	I ² C SCL
10	I ² C SDA

4-pin TP Connector

The 4-pin TP connector on the side of the USB-AOUT has no function.