BEAM SPLITTER/COMBINER
ACCESSORIES
Operation and Installation Manual

Table of Content

1 Introduction

Thank you for purchasing the Avantes DA beam splitter / combiner. This add-on accessory provides the possibility of combining 2 light signals into one light path or to split a light signal into 2 light paths with the option to switch between channels automatically by.
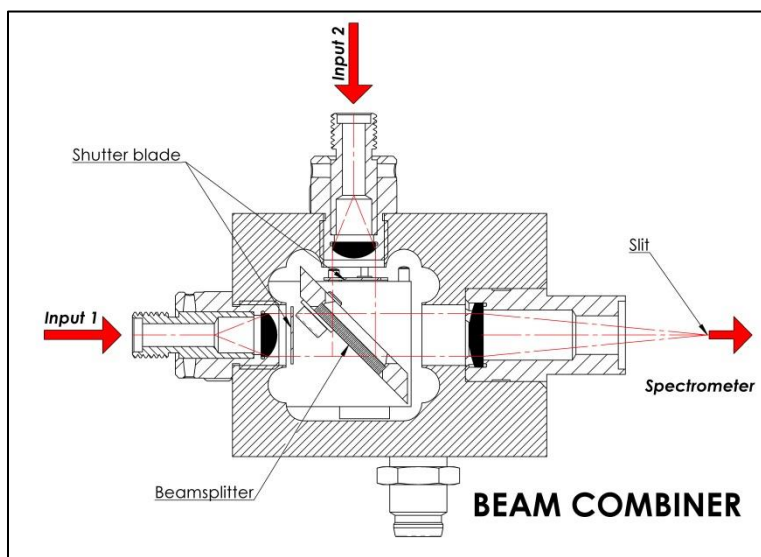
DA-Beam splitter
When used as a beam splitter this accessory will provide you the possibility to split a single light beam into two light beams (please see the example below).
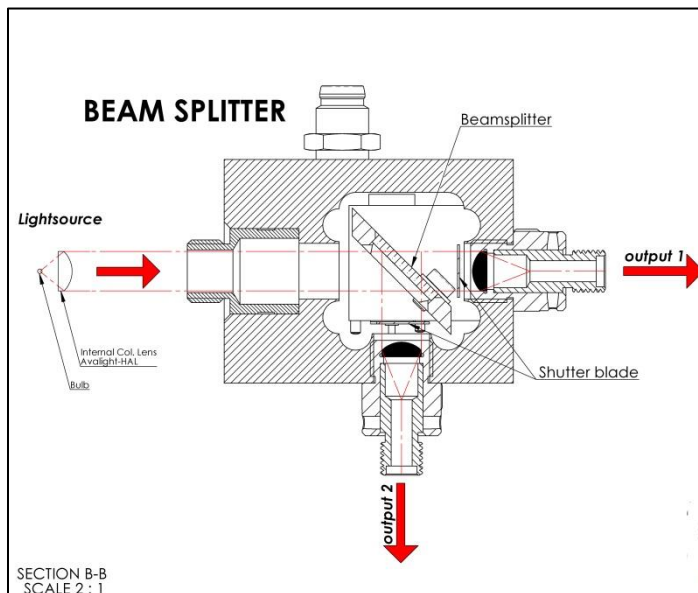
DA-Beam combiner
When used as a beam combiner this accessory will turn two light beams into one light beam.

2   Quick start

2.1   DA-Beam combiner

The DA-Beam combiner uses two shutters to individually switch two input channels that are connected on a single spectrometer.

AvaSoft 8 allows you to either switch between the two individual channels or use both channels together as if you would have three virtual spectrometers. The third virtual spectrometer is a combination of the two individual spectrometers.

First you have to set-up the DA-Beam combiner in the Options screen.
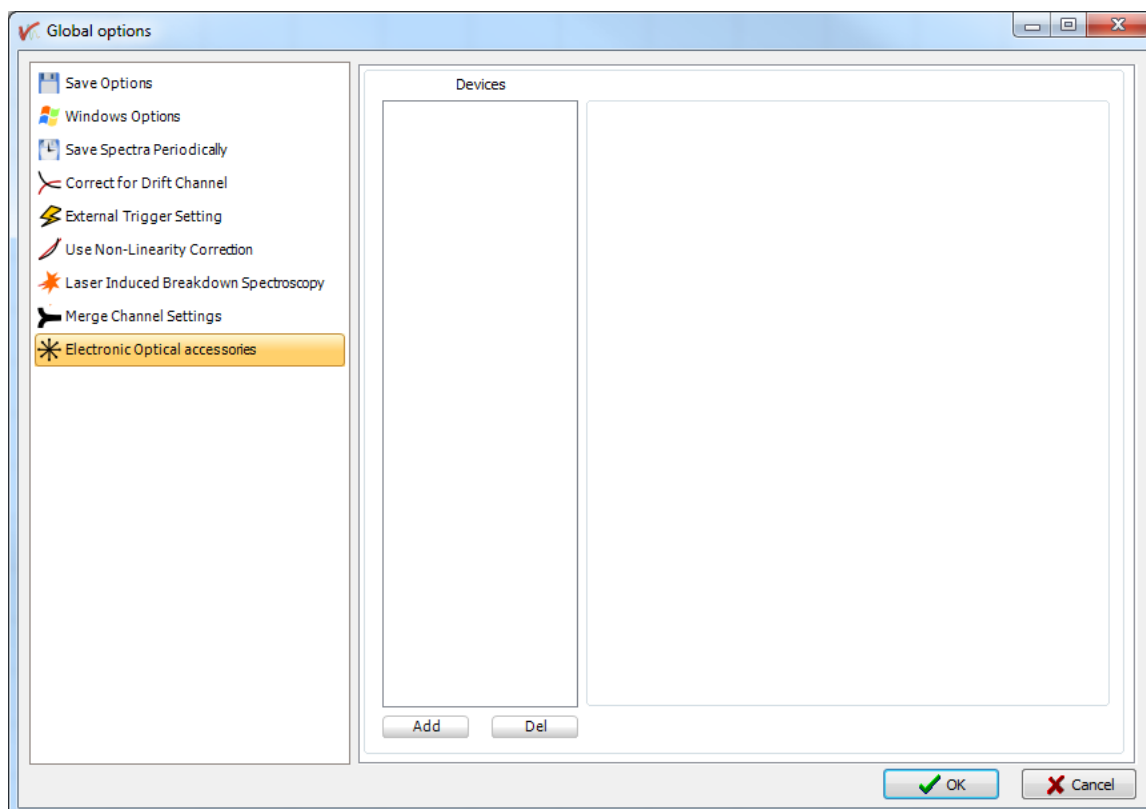
Select 'Options', 'Electronic Optical Accessories'
If the device is not listed yet (the default name is BEAMCO000), press the 'Add' button and select 'Beam Combiner' in the "Select Device Type" drop down box.
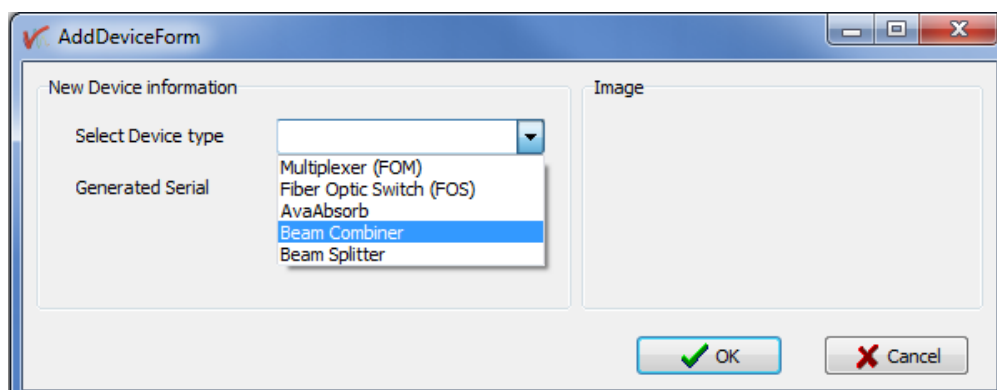
Press 'OK'
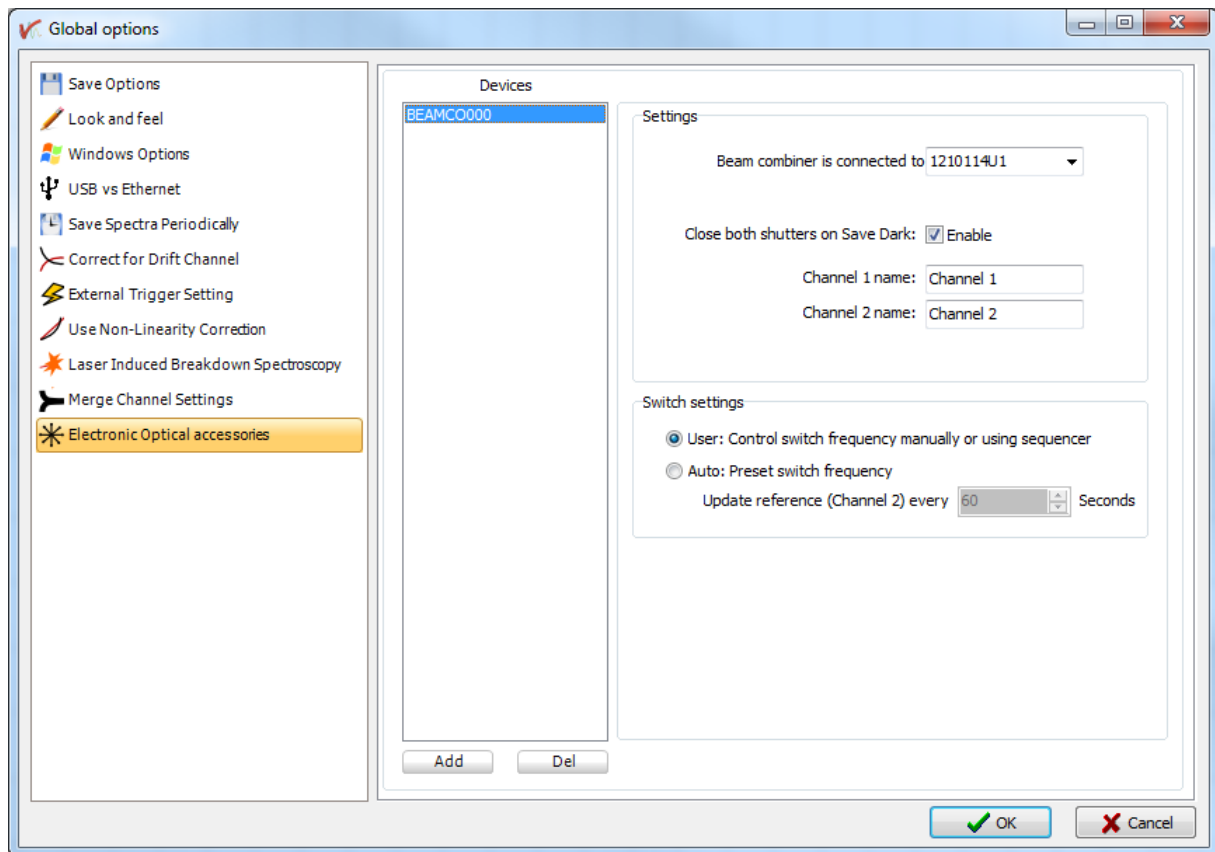
You can select automatic shuttering on Save Dark
You can edit the names of the channels
You can either manually change channels or set a timer to do this with a pre-set interval.

Press 'OK' to close the options form.

Now you are able to use the accessory as beam combiner in combination with the selected spectrometer and start measuring spectra. You will find 4 labels in the spectrometer panel.

2.1.1 Spectrometer Panel

Beam combiner status

Channel 1

Channel 2

Channel 1 + 2 (combined)

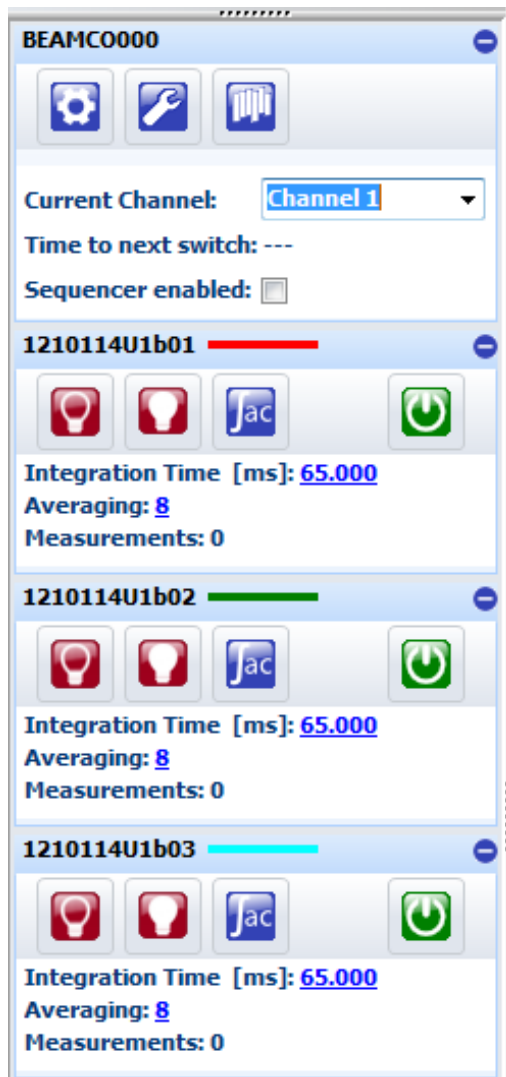Consecutively presses both Auto configure Buttons on the spectrometer panel at the left side of the screen. They will briefly change color to green while performing the auto integration time procedure.

Take Dark and Reference readings by consecutively pressing the four buttons with light bulb icons and in the spectrometer panel at the left side of the screen. Each pressing will be followed by a confirmation dialog, and the corresponding light bulb icon will then be colored green.

You are now ready for measurements and data storage.

2.1.2 Correction for drift

The combination of beam combiner and spectrometer can also be used for correction for drift
You can use one of the two channels to correct the other channel.
First you have to set-up the accessory as beam combiner as described in chapter 1.

Select 'Options', 'Correct for Drift Channel'

Select the channel in the 'Correction Source (reference)' drop down box that you want to use to correct the other channel.
Leave the checkbox in the 'Correct' column unchecked for now.

Again, you can either manually change channels here or set a timer to change them with a pre-set interval.

The setting for 'Correction mode' will be shared with the 'Switch Settings' in the 'Electronic Optical Accessories' dialog described above. If you change either one, the other one will be changed as well.

Press 'OK' to close the options form.

Start measuring by pressing the 'Start' button in the upper left corner of the screen.

2.2   DA-Beam splitter

The DA-Beam splitter operates almost the same as the DA-Beam combiner. The main difference will be that the DA-Beam splitter is connected to a light source and that there aren't any virtual spectrometers.

See chapter 'DA-Beam combiner' how to setup you DA-Beam splitter.
Choose in the 'Options' menu the DA-Beam splitter instead of the DA-Beam combiner.

2.2.1   Spectrometer Panel
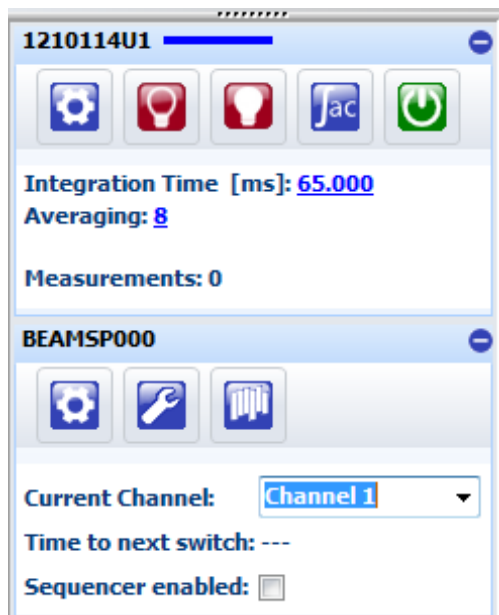
3 DA-Beam combiner/splitter

3.1 General
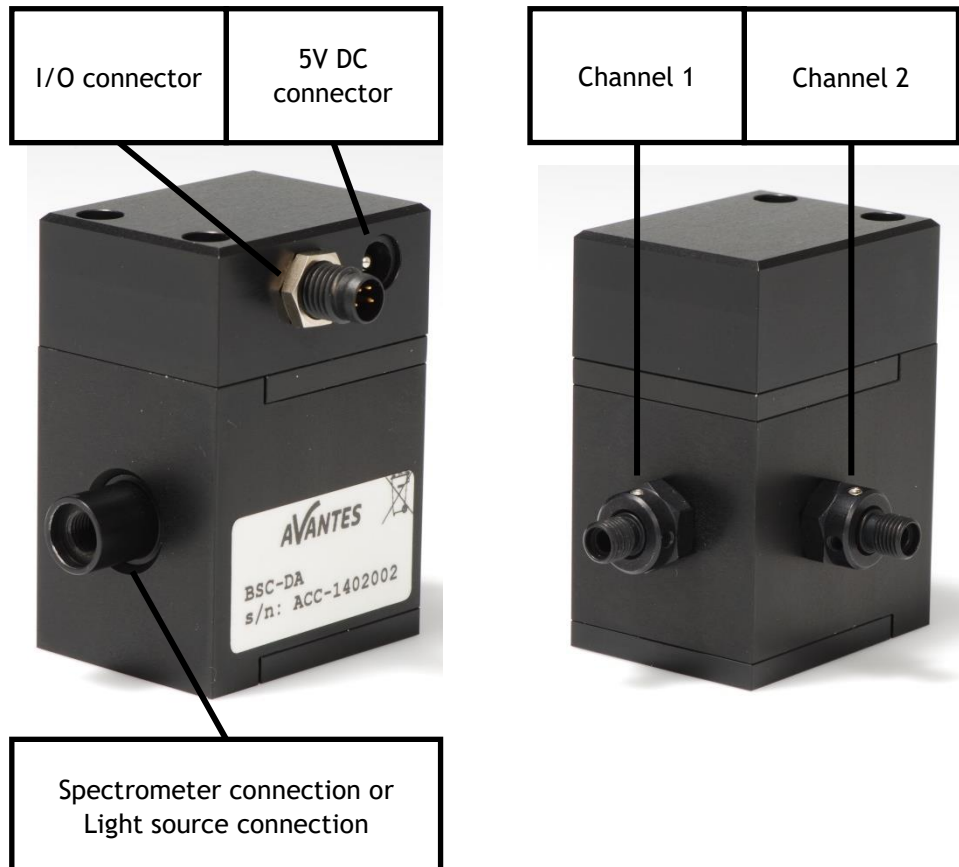
DC power connector
Insert the 5V DC power supply plug of the adapter into the unit.

I/O connector
Insert the connector of the IC-DB26-BEAM-0.6 (or IC-DB26-BEAM-2) into the unit and lock the connector with the screw terminal.

Pin	Description
1	Channel 2: Shutter Open/Close (High = Open, Low = Close)
2	GND
3	Channel 1: Shutter Open/Close (High = Open, Low = Close)
4	GND

Pin 1 is connected to DO8 of the DB26 connector (AS5216 board) and pin 3 is connected to DO5 of the DB26 connector.

Channel 1 and Channel 2
Both connectors of channel 1 and channel 2 are for use only with SMA-Fiber connectors.

Channel 1 and channel 2 could function as an optical input (DA-Beam combiner) or it could function as an optical output (DA-Beam splitter).

3.2 Install the DA-Beam combiner/splitter

You must first screw the part with the optical lens on the SMA connector of your spectrometer or light source. If your light source does not have a SMA connecter you must use the part without the optical lens. Screw that part on you light source.

Place the DA-Beam combiner/splitter unit over the part with (or without) the optical lens.
Use the Allen key screw to lock the DA-Beam combiner on the spectrometer.

Allen key

3.3   Re-calibrate channel 1 and channel 2

Both channels are calibrated with a 400µm fiber to the same input/output level.
When a different fiber diameter is used the channels need to be re-calibrated.
With the following steps you can re-calibrate your Beam combiner/splitter.

Step 1.   Install the Beam combiner/splitter on a spectrometer.
Step 2.   Attach your optical fibers (with the same diameter) to the Beam combiner/splitter.
Step 3.   Attach the other end of the fiber to the same light source (one by one).
Step 4.   Start-up AvaSoft 8 and measure both channels of the Beam combiner/splitter.
Step 5.   Use the allen key to loosen the screw of the SMA bus for both channels of the Beam combiner/splitter.
Step 6.   Set the signal of channel 2 to the maximum by moving the SMA bus in and out. At the maximum signal level secure the position of the SMA bus by fastening the screw.
Step 7.   Set the signal of channel 1 @ the same level as channel 2. When the level is reached secure the position of the SMA bus by fastening the screw.

When it is not possible to get channel 1 to the same level as channel 2, you first set channel 1 to the maximum level and then set channel 2 to the same level as channel 1.

Now your Beam combiner/splitter is re-calibrated.

4 AvaSoft manual for DA-Beam combiner/splitter

4.1 DA-Beam combiner

AvaSoft 8 operates the DA-Beam combiner by defining three extra virtual spectrometers. You can separately define parameters like integration time, number of averages, dark and reference spectrum for all three channels.

Please refer to the AvaSoft manual for general operation of the spectrometer. This manual only describes the changes that are relevant to the DA-Beam combiner. These are mainly situated in the Options form and in the Spectrometer panel in the main form.

4.1.1 Options Form

'Options', 'Electronic Optical Accessories'

The 'Add' and 'Del' buttons are used to add or remove the DA-Beam combiner functionality. If you press 'Del', and close the form, the DA-Beam combiner will not be used.
After pressing 'Add' in the initial setup, you will get the screen above. Please enable the shutter on Save Dark by leaving the 'Enable' box checked.
You can edit the Channel names in the respective edit boxes.
The Switch Settings allow you to either manually change channels, or change them with a timer.
You can set the timer interval in seconds in the respective box.

You will need to press 'OK' to close the form, and continue using AvaSoft.

'Options', 'Correct for Drift Channel'

You can use the second channel to correct the first channel for drift, e.g. resulting from slow deterioration of the lamp intensity.

Select the second channel in the top drop down box, the first will then be listed in the 'Correct for' table. Check the 'Correct' checkbox to enable Correct for Drift. Uncheck to disable.

Please only enable the 'Correct for Drift' function after having established a correct setup. Using it together with the Auto configure function might give less favorable results.

The bottom part lets you select between manual switching of the channels, and automatic switching, by setting a timer. You can set the timer interval in the 'Seconds' box.

Please note that this last selection is shared with the 'Switch Settings' selection in the 'Electronic Optical Accessories' form above. If you change either form, the other one will be changed too.

You will need to press 'OK' to close the form, and continue using AvaSoft.

4.1.2 Spectrometer Panel:

Click the icon to change the settings of the spectrometer that is used. Please refer to the AvaSoft 8 manual for a detailed description of all options.

The icon will take you to the same settings that are available after opening the 'Options', "Electronic Optical Accessories'. Please refer to the description above.

Click the ![icon] icon to change the settings of the sequencer that can be used.

Click the 'Add Step' button to add a step to the sequencer.

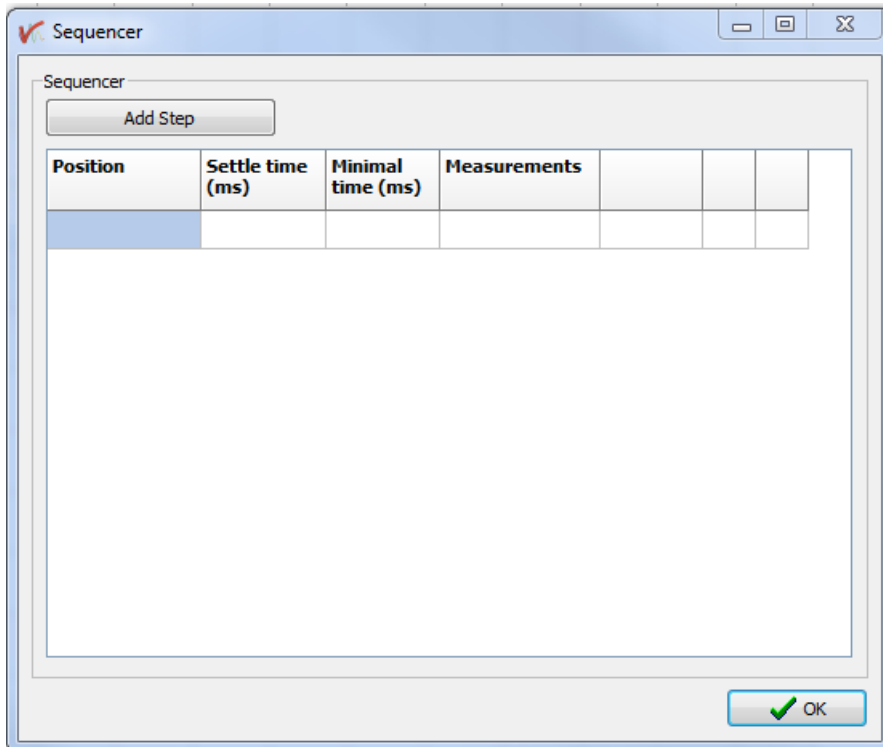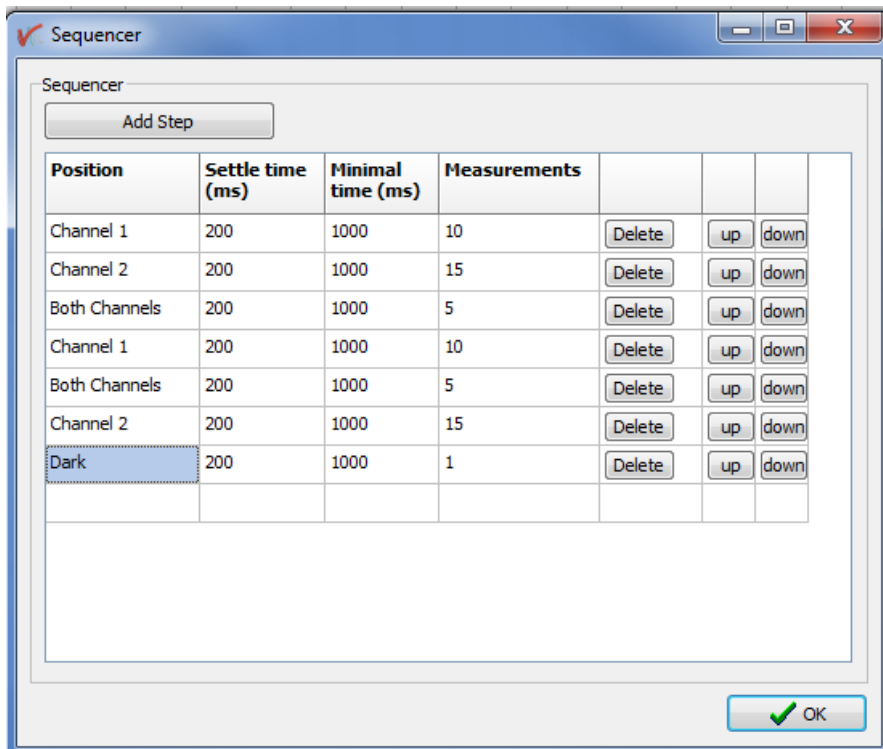| Position	Settle time (ms)	Minimal time (ms)	Measurements			
Channel 1	200	1000	10	Delete	up	down
Channel 2	200	1000	15	Delete	up	down
Both Channels	200	1000	5	Delete	up	down
Channel 1	200	1000	10	Delete	up	down
Both Channels	200	1000	5	Delete	up	down
Channel 2	200	1000	15	Delete	up	down
Dark	200	1000	1	Delete	up	down

You can change the position, settle time, minimal time and number of measurements.

When the position gets changed the measurement will starts after the 'settle time' has expired. This means that the 'settle time' represent a delay time that is necessary for the mechanical movement. The 'settle time' can be reduced.

After the 'settle time' the 'minimal time' will be used.

The 'minimal time' represent the minimum time of the measurement at the position that is set. If the total amount of measurements will take more time than the 'minimal time' this will be overruled.

The 'Current Channel' drop down box lets you change channels manually. If you have selected timer operation in the 'Options' form, it will be dimmed.

When operating in timer mode, the time to the next switch will be displayed in the next line.

The DA-Beam combiner creates three virtual spectrometers. The first virtual spectrometer represents channel 1 of the DA-Beam combiner, the second virtual spectrometer represents channel 2 of the DA-Beam combiner. The third virtual spectrometer is the combination of both channels of the DA-Beam combiner.

All the virtual spectrometer channels have their own panel. On top, it lists the name of the spectrometer, the color of its line in the graph and a button to collapse or expand the panel.

In the next line, the Dark and Reference buttons are located. After pressing these, dark and reference spectra will be taken. The spectrometer will block the light with a shutter when taking a dark spectrum.

The Auto Configure button is used to adjust both Integration Time and Averages to an 'optimal' level.

If you are looking for an optimal Integration Time, please leave the 'Correct for Drift' function disabled. Depending on your signal and your patience, a higher value for Averaging is preferable, as it will result in less noise.

The right button can be used to switch off the channel. It is only useful when there are more spectrometers attached to your computer system.

The bottom lines list the Integration Time and Averaging number used, as well as the number of Measurements taken since the last press of the 'Start' button.

You can edit the 'Integration Time' and 'Averaging' values by clicking their numbers. An edit box will appear.
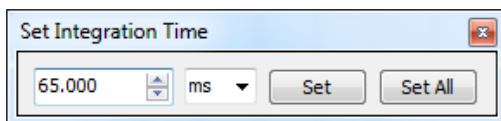
Edit the value and press the 'Set' button.

4.2   DA-Beam splitter

AvaSoft 8 operates the DA-Beam splitter as a separate device. The DA-Beam splitter has exactly the same control panel as the DA-Beam combiner. The functions are all the same, so see chapter '4.1 DA-Beam combiner' about the working of those functions.

Please refer to the AvaSoft manual for general operation of the spectrometer. This manual only describes the changes that are relevant to the DA-Beam splitter. These are mainly situated in the Options form and in the Spectrometer panel in the main form.

5 Technical support

Getting Help
If you have any questions, comments or requests concerning your Avantes DA-Beam combiner/splitter or the AvaSoft software, please go to
http://www.avantes.com
There you'll also find details on how to contact our Technical Support Team via e-mail or telephone.

Software Updates
To check for updates, you can choose "Check for Updates" from the Help menu or go to the "Support" section on our website www.avantes.com.

6   Specifications

Description	Specification
Wavelength range	250-2000 nm
Throughput	Ca. 25%
Temperature range	0 – 40 °C
Switching time open	15 ms
Switching time close	30 ms
Maximum frequency	10 Hz
Power supply	5VDC, 0.3A (max power 1.5W)
Fiber connection	SMA-905 connector
Material mechanical	Black anodized aluminum
Material optical	UV Fused silica
Dimensions (LxWxH)	44x34x63 mm **
Weight	184 grams

 *) Based on the AvaSpec-ULS3648 spectrometer.
**) Exclusive COL-UV/VIS and I/O connector.

Ordering Information:

BSC-DA   Direct attached beam splitter combiner, included standard IC-DB 26-BEAM-0.6
                              (0.6m length)
PS-5V/1.1A   Power supply 5V/1.1A

Options:

FH-DA   Variable In-line filter holder for filters 12,5 mm diameter and 1 to 8 mm
                              thickness, incl.2 collimating lenses.
IC-DB26-BEAM-2   Interface cable DB26 to Beam splitter/combiner 2m