# UCTD Salinity Profiles

This guide provides instructions on how to derive salinity profiles from UCTD data using Sea-Bird's SBE Data Processing software. From start to finish, the process involves at least these steps:

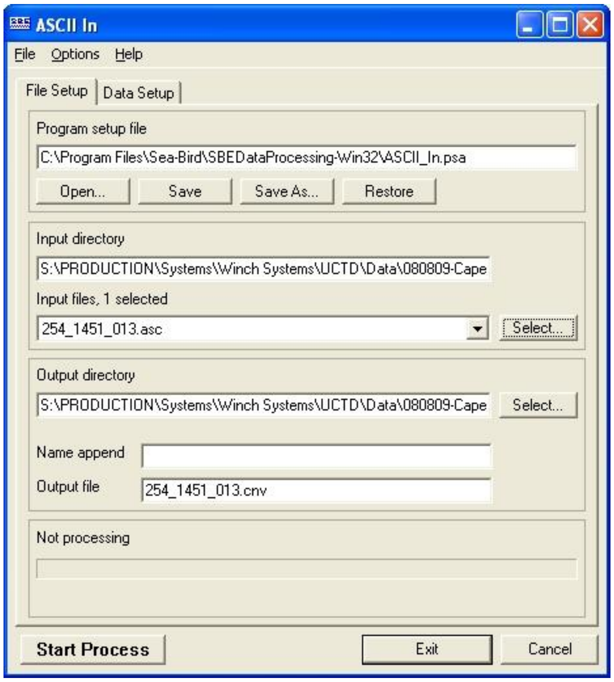
- Converting the ASCII data files downloaded from the probe via uCast or UCTDTerm into the Seabird format.
- Aligning the temperature and conductivity time series to reduce so-called spiking in the salinity profiles.
- Calculating salinity from the aligned C, T, and P data records.

Once the salinity data have been derived, it is possible to plot individual profiles within SBE Data Processing. Alternately, the data can be output in ASCII format for further handling or processing with other software/graphics applications.

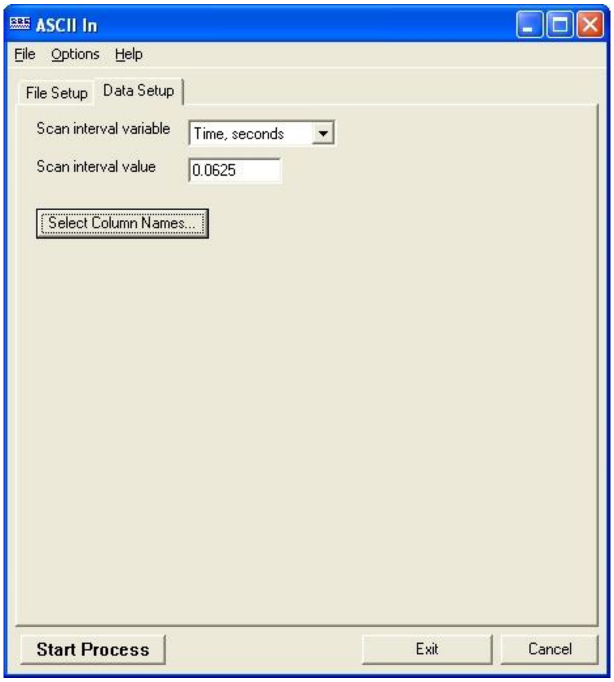
## 1. Importing UCTD data

First, the UCTD data needs to be converted into a Seabird compatible data format. After starting the application, choose the **ASCII In…** menu item on the **Run** tab. This will bring up a window with two tabs.

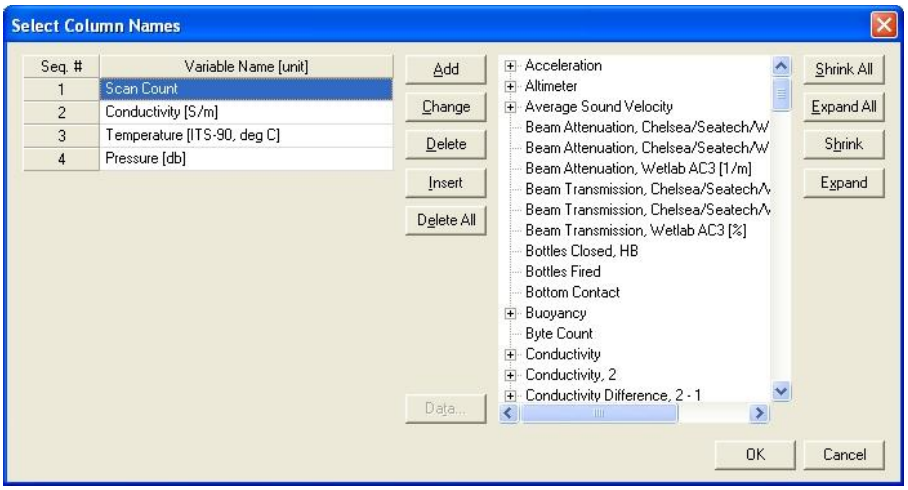
**Step 1** In the **File Setup** tab, enter the input directory where the data are located and select the data file.




**Step 2** Now choose the **Data Setup** tab and enter the **scan interval variable** and **scan interval value** as shown below. The click on **Select Column Names…** .



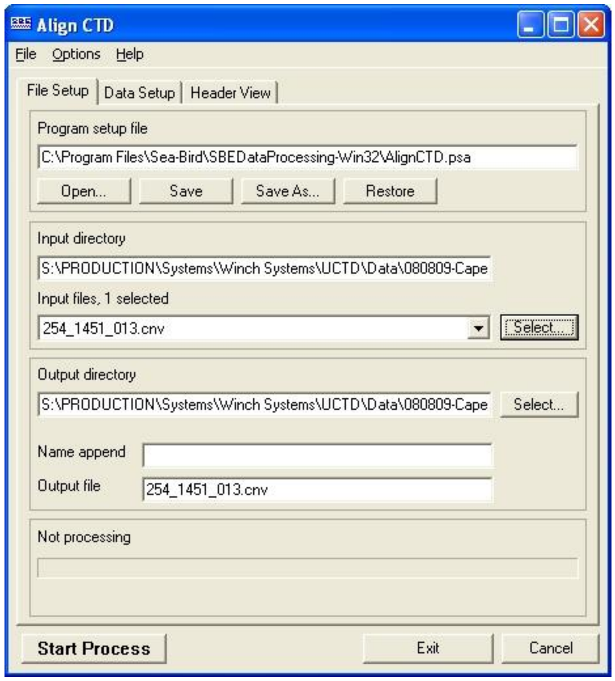
**Step 3** The files downloaded from the UCTD probes contain data in four columns. The first column holds the scan number, the second columns lists conductivity in S/m, the third column temperature in degC, and the last column has the depth information in decibars. Now, add the **Variable Names** as shown below, click **OK**, and then **Start Process**. Ensure that the correct units are selected for the different physical variables. This will produce an output file with a ".cnv" extension which is used for further processing.



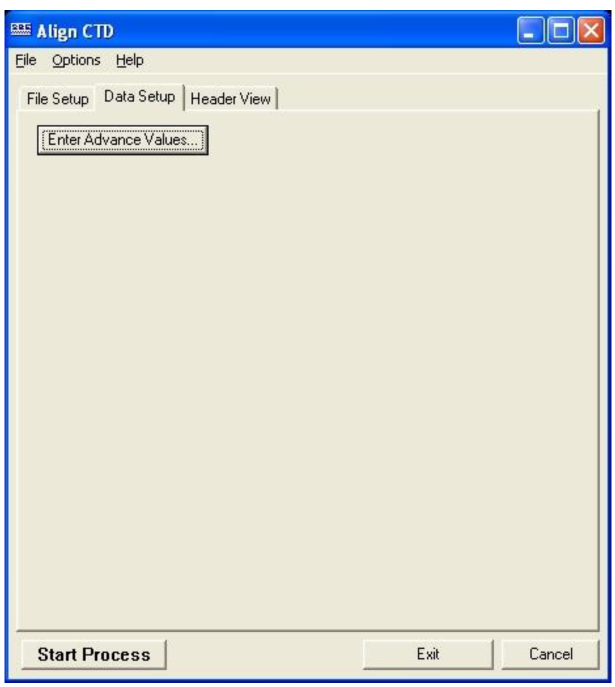

## 2. Aligning CT data

Since the conductivity and temperature sensors have different response times, the fast profiling can produce so-called spiking in the salinity data, when the temperature in the water column changes rapidly. In order to minimize these artifacts, the data from the two sensors must be corrected. This is accomplished simply by shifting the temperature data with regard to the conductivity data in time as shown in the steps below.

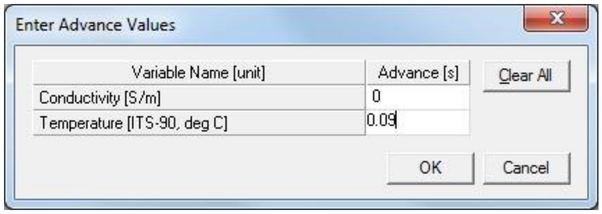
**Step 1** Choose the **Align CTD…** command in the **Run** menu and select the file produced in the previous section. Choose a different o**utput file name** or enter a token in the **Name append** section unless you want to overwrite this file.




**Step 2** Click on **Enter Advance Values…** in the **Data Setup** tab.



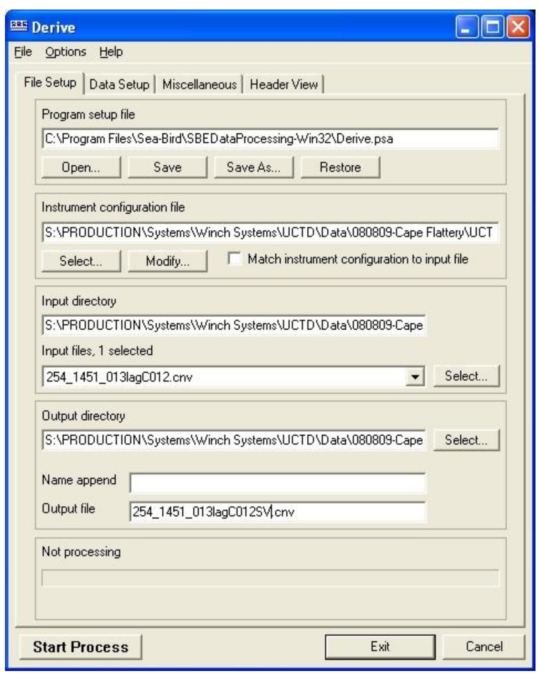
**Step 3** Enter the values shown below for **conductivity** and **temperature**. Click **OK** and **Start Process**. The output file created will the temperature values advanced in time by 0.09 s with regard to the conductivity values. Advancing the temperature record with regard to the conductivity data accounts for the slower response time of the temperature sensor. The optimal value is typically around 0.09s for UCTD free casts, but the lag should always be chosen such that the spiking in the salinity profile is minimized.



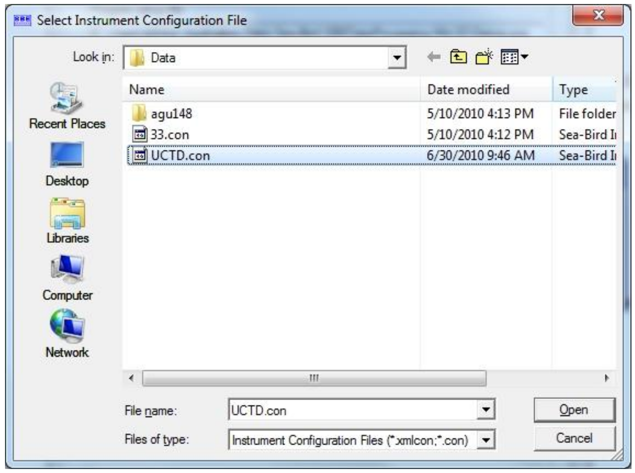

## 3. Calculating Salinity

Now we use the corrected time series to calculate the salinity profiles.

**Step 1** Choose the **Derive…** command in the **Run** menu.

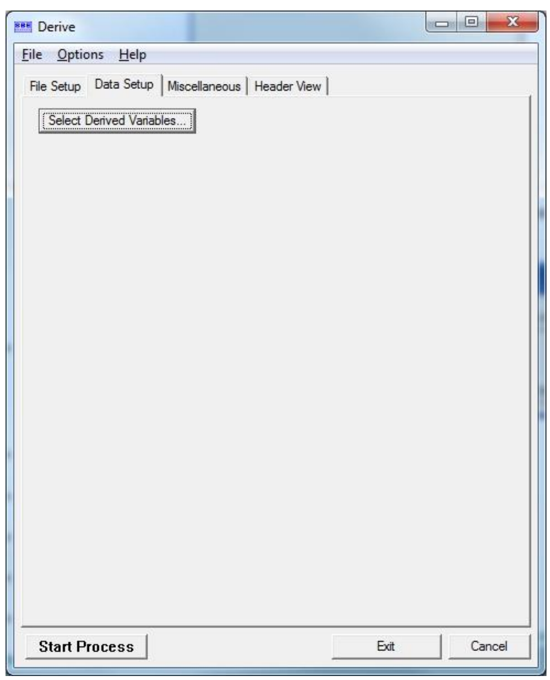


**Step 2** In the panel shown above, select the file select **UCTD.con** as the instrument configuration file. This file is available on the software CD provided with each UCTD probe.

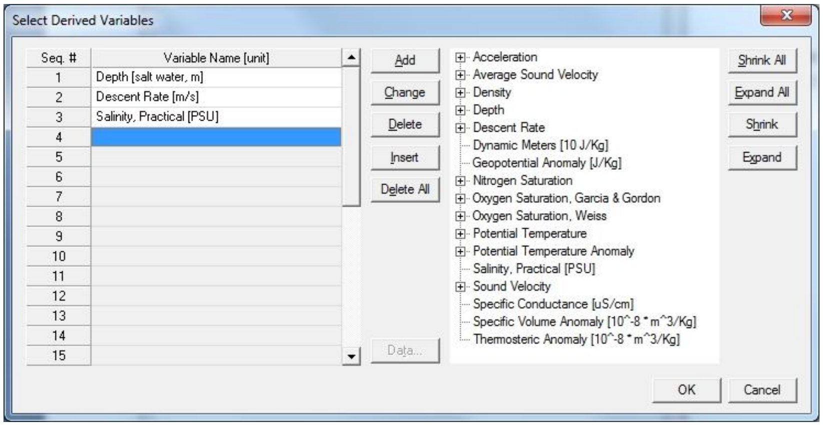



**Step 3** Now select the file CT aligned data file produced in the previous section. Choose a different **output file name** or enter a token in the **Name append** in the **File Setup** tab unless you want to overwrite the original data file.

**Step 4** Click on **Select Derived Variables…** in the **Data Setup** tab.

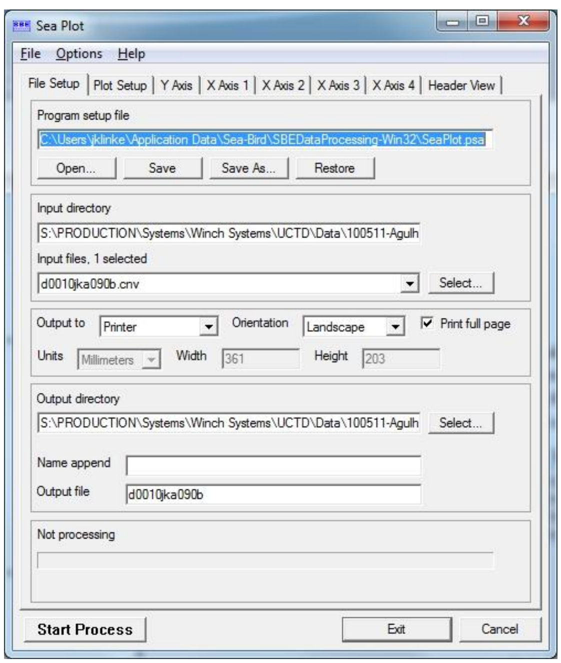


**Step 5** Add the **Variable Names** for the quantities you would like to calculate, e.g. depth, descent rate, and salinity as shown below, and click **OK**. Then choose **Start Process**. In the example below, this will produce a file in Seabird format, with depth listed in first column, decent rate in the second column, and salinity in the third column.

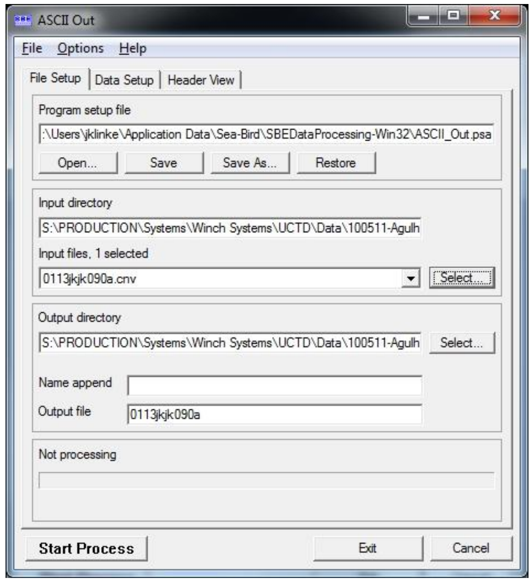



## 4. Optional Steps

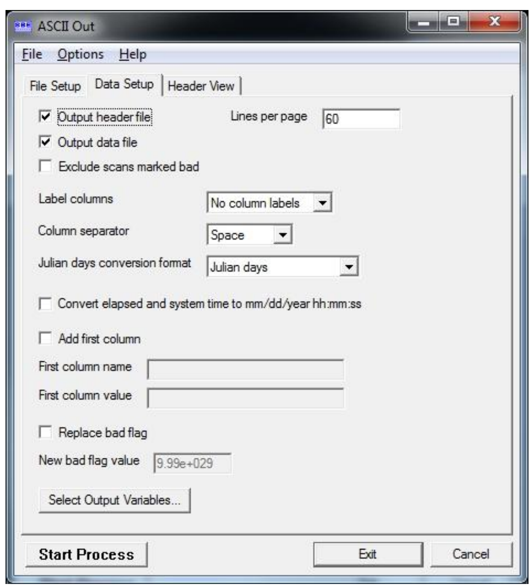
The **SeaPlot** command is used to plot individual profiles.



In order to convert the salinity data to an ASCII file, use the **ASCII Out** command in the **Run** menu:




Once you have selected the input data file, switch to the **Data Setup** tab:



Now select the desired quantities from the list of output variables: