

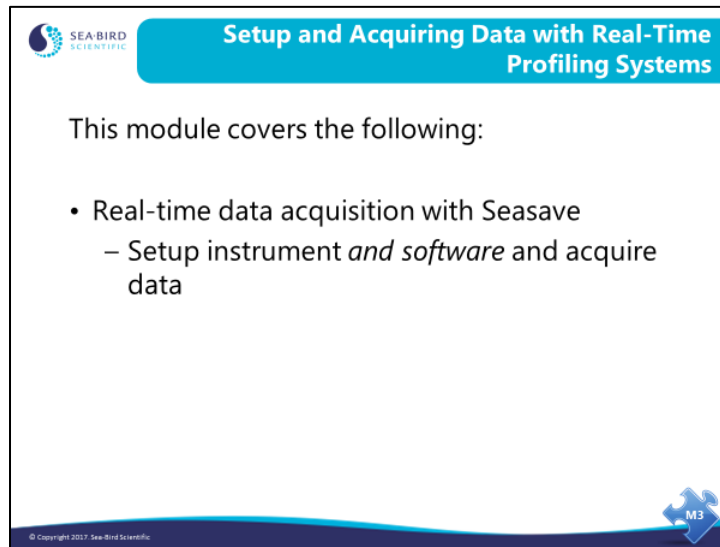


Setup and Acquiring Data with Real-Time  
Profiling Systems

Sea-Bird Scientific University Module 3



## Overview



SEA-BIRD SCIENTIFIC

### Setup and Acquiring Data with Real-Time Profiling Systems

This module covers the following:

- Real-time data acquisition with Seasave
  - Setup instrument *and software* and acquire data


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We are going to discuss Seasave V7, an application that collects real-time data and saves it to a file. By the end of this module you should be able to:

- Set up Seasave V7 to collect data in the manner that best suits your application.
- Use Seasave V7 to manipulate your configuration (.xmlcon or .con) file as appropriate for your instrument and auxiliary sensors.
- Use Seasave V7's capability for making file header annotations.
- Use Seasave V7's capability for marking points of interest in the real-time data and saving marked data into a file.


## Sea-Bird software for recording and processing data



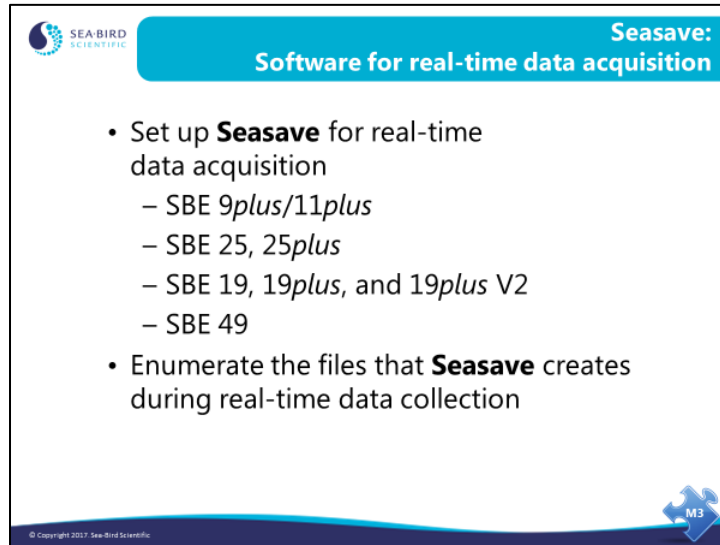
Sea-Bird software for recording and processing data

- **SeatermV2** - user interface for internally recording instruments that can output data in XML
- **Seaterm** - user interface for older instruments
- **Seasave V7** - software for real-time data collection
  - Most instruments that can report real-time use Seasave V7
- **SBE Data Processing** – software for post-processing data

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## Seasave: Setup for Real-Time Data Acquisition

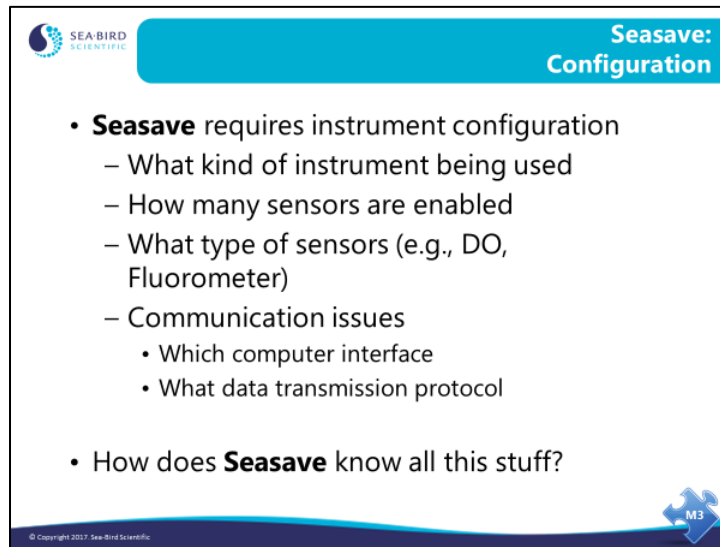


The slide features the SEA-BIRD SCIENTIFIC logo in the top left corner. A blue header bar at the top right contains the text "Seasave: Software for real-time data acquisition". The main content area contains a bulleted list of instructions. In the bottom right corner, there is a blue puzzle piece icon with the number "M3" inside it. At the very bottom left, there is a small copyright notice: "© Copyright 2017 Sea-Bird Scientific".

- Set up **Seasave** for real-time data acquisition
  - SBE *9plus/11plus*
  - SBE *25, 25plus*
  - SBE *19, 19plus, and 19plus V2*
  - SBE *49*
- Enumerate the files that **Seasave** creates during real-time data collection

Next, we are going to discuss Seasave, an application that collects real-time data and saves it to a file. We will learn how to set up Seasave and what files are created in the process of data collection.

## Seasave: Instrument Configuration



The slide features the SEA-BIRD SCIENTIFIC logo in the top left corner and the title "Seasave: Configuration" in a blue header bar at the top right. The main content is a bulleted list. At the bottom left, there is a small copyright notice: "© Copyright 2017 Sea-Bird Scientific". At the bottom right, there is a blue puzzle piece icon with the number "M3" inside it.

- **Seasave** requires instrument configuration
  - What kind of instrument being used
  - How many sensors are enabled
  - What type of sensors (e.g., DO, Fluorometer)
  - Communication issues
    - Which computer interface
    - What data transmission protocol
- How does **Seasave** know all this stuff?

Without this information Seasave is not able to properly process the data stream that is received from an instrument. This is the template for all communications and data processing.

## Seasave: Instrument Configuration (*continued*)

**Seasave:**  
**.con or .xmlcon configuration files**

- Configuration data is stored in a file (for example, default file is *seasoft.con*)
- In addition, calibration coefficients are stored in this file
  - Coefficients can also be programmed into instrument, but configuration file will always override what is in instrument
- You may edit *.con* or *.xmlcon* file directly
  - Double click on *.con* or *.xmlcon* file
  - Edit using Seasave or SBE Data Processing (discussed later)

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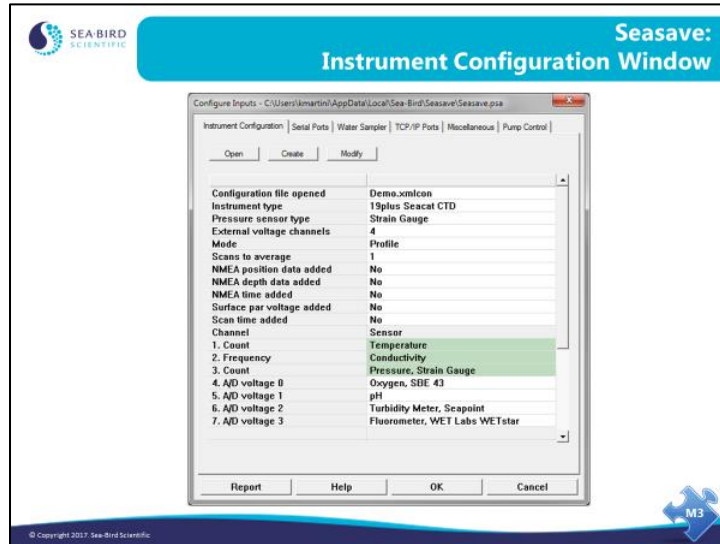
Sea-Bird supplies a configuration file with each new or recalibrated instrument, on a CD shipped with the instrument. The configuration file defines what sensors are integrated with the CTD, what channels are used by those sensors, sensor calibration coefficients, and sampling rate. **The configuration file must match the instrument and contain current calibration coefficients.** If you make changes in the field (for example, replace an old transmissometer with a new one, or add or remove a sensor), **YOU MUST UPDATE THE CONFIGURATION FILE!!**

- Along with changing the configuration file, you must update the setup **in the instrument**. Remember commands we sent to the 19*plus* V2 to disable auxiliary sensor channels (Volt0=N, etc.)? If you now want to connect an auxiliary sensor to one of those channels, you must *enable* the channel in the CTD, as well as update the configuration file to include the new sensor. If you do not enable the channel in the instrument, you will not get any data from the channel.

The most common customer problem is mistakes in the configuration file. All Sea-Bird profiling instruments produce a coded data file. The information to decode this file is found in the configuration file. The configuration file allows one application to service many instrument types.

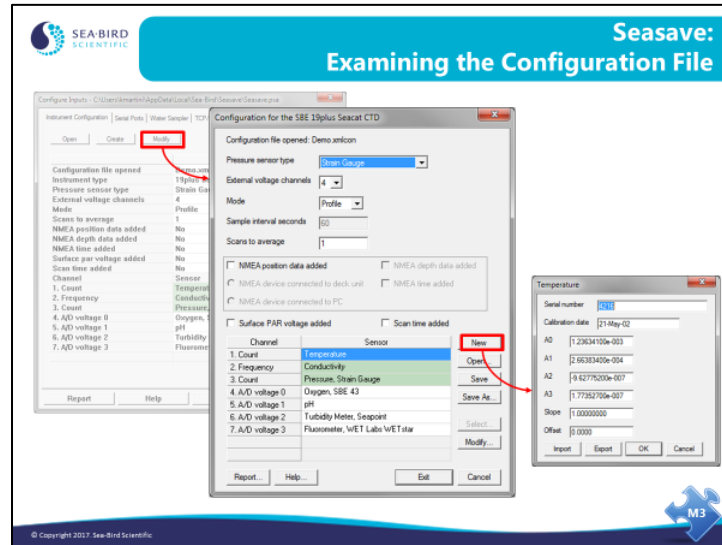
- **In 2009**, Version 7.20a of Seasave and SBE Data Processing introduced the *.xmlcon* file, written in XML format. The software allows you to open a *.xmlcon* or *.con* file, and to save the configuration to a *.xmlcon* or *.con* file. We'll use *.con* files for some exercises in the class, but *.xmlcon* files provide the same results. **Many sensors/instruments developed since 2009 are not compatible with the older *.con* file, and require a *.xmlcon* file.**

## Seasave: Instrument Configuration (*continued*)



Click the Configure Inputs menu to get the Configure Inputs dialog box; the first tab is the Instrument Configuration tab. From the Instrument Configuration tab, you can open and examine an existing .xmlcon or .con file, or create a new .xmlcon or .con file.

## Seasave: Instrument Configuration (continued)



The configuration (.xmlcon or .con) file contains information about your instrument configuration and the calibration coefficients for your sensors. For example, you can suppress unused frequency channels; many *9plus* CTDs only have one temperature and one conductivity sensor. Suppressing 2 frequency channels allows you to collect data from the *9plus* without 2 frequency channels that will always be zero. Similarly, you can suppress unused voltage channels in pairs (shown as voltage words). You must suppress pairs because of constraints on the binary data format that comes from the *9plus*. For example, if you have 1 temperature sensor, 1 conductivity sensor, a fluorometer, and an SBE 43 dissolved oxygen sensor, you can suppress 2 frequency channels and 3 voltage words, saving 14 bytes per data scan.

The configuration file also has a selection of computer interface, RS-232 or IEEE-488. If your computer is equipped with an IEEE-488 board, you may select IEEE-488. The IEEE-488 communication protocol is faster than the serial port and was more commonly used when computers were slower than those available today.

The *11plus* can average incoming scans and present the result to your computer. This will also reduce the file space needed to store your data. However, modern computers have large memories, and the loss of resolution in your CTD data makes averaging any more than 2 scans unattractive for most applications.

You may plug a light meter into the *11plus* and include Surface PAR (photosynthetically active radiation) in your data stream. This is useful for determining percent available PAR as your CTD equipped with a PAR sensor descends into the darkness.

Time and position may be added to the data scans as well. The *Scan time added* check box causes Seasave to append your computer system time to each scan and the *NMEA position* check box appends a Latitude and Longitude from a GPS receiver that is transmitting NMEA message 0183.

Each data channel can then be assigned a sensor.



## Activity: Create Configuration File

1. Click Start / Programs / Sea-Bird / Seasave V7 (**not** Seasave-Win32!).
2. In Seasave V7, open and modify new instrument configuration:
  - A. Click *Configure Inputs* menu.
  - B. On Instrument Configuration tab, click *Open*.
  - C. Navigate to the Data folder on your hard drive, and select 7402.xmlcon. Click *Open*.
  - D. On Instrument Configuration tab, click *Modify*.
  - E. Make or verify the following selections in the Configuration dialog box:

Select:	Discussion
Pressure sensor type -- Strain Gauge	Must match factory setting in 19plus V2 - see <b>DS</b> response.
External voltage channels – 0	Must match voltage sensor enabling/disabling in 19plus V2 (Volt0=, Volt1=, etc.) - see <b>DS</b> response.
Mode – Profile	Must match mode in 19plus V2 (MP) - see <b>DS</b> response.
Serial RS-232C sensor – None	Must match auxiliary sensor enabling / disabling in 19plus V2 - see <b>DS</b> response.
Scans to average – 1	Must match number of scans to average in 19plus V2 (NAvg=) - see <b>DS</b> response.
NMEA data added – <b>not</b> checked	
Surface PAR voltage added – <b>not</b> checked	
Scan time added – <b>not</b> checked	

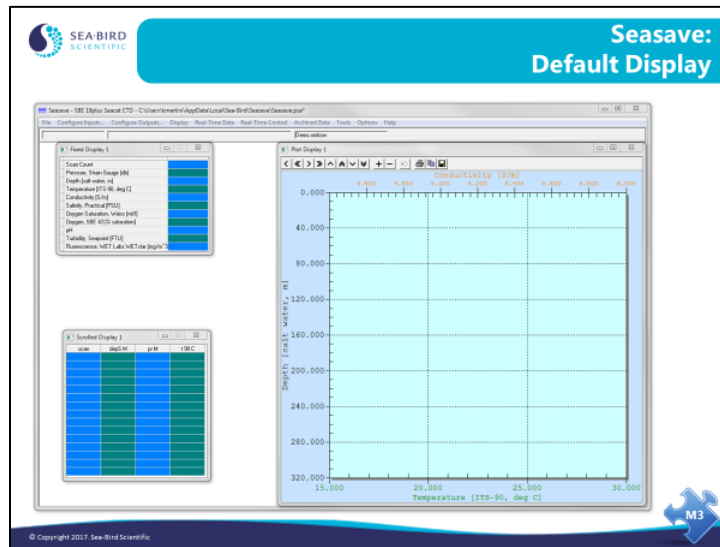
In the Sensor list, click *Temperature*, and click the *Modify* button. In the dialog that pops up: verify that the calibration coefficients match the Temperature calibration sheet and verify that the slope is 1.0 and offset is 0.0. Make any necessary changes, and click OK.

In the Sensor list, click *Conductivity*, and click the *Modify* button. In the dialog that pops up: verify that the calibration coefficients match the Conductivity calibration sheet and verify that the slope is 1.0 and offset is 0.0. Make any necessary changes, and click OK.

In the Sensor list, click *Pressure, Strain Gauge*, and click the *Modify* button. In the dialog that pops up: verify that the calibration coefficients match the Pressure calibration sheet and verify that the offset is 0.0. Make any necessary changes, and click OK.

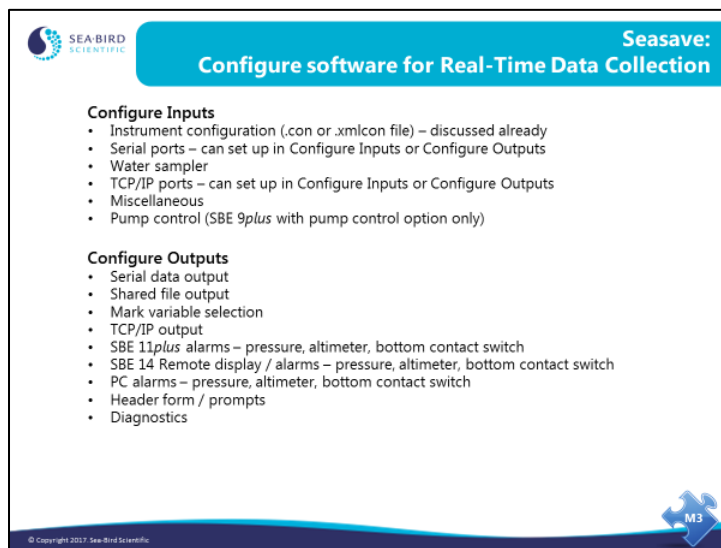
- F. In the Configuration dialog box, click *Save As* and save your .xmlcon file in C:\Data with file name *test* (i.e., C:\Data\test.xmlcon).

## Seasave: Default Display



The slide above has all three data windows visible. The top left window is a fixed display and the bottom left window is a scrolling display. The right window is a multi-axis plot.

## Seasave: Configuring Inputs and Outputs



The slide features the SEA-BIRD SCIENTIFIC logo in the top left corner. A blue header bar at the top right contains the text "Seasave: Configure software for Real-Time Data Collection". The main content is organized into two sections: "Configure Inputs" and "Configure Outputs", each with a bulleted list of items. A blue puzzle piece icon with "M3" is located in the bottom right corner. The footer contains the copyright notice "© Copyright 2017 Sea-Bird Scientific" on the left.

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**Seasave:**  
**Configure software for Real-Time Data Collection**

**Configure Inputs**

- Instrument configuration (.con or .xmlcon file) – discussed already
- Serial ports – can set up in Configure Inputs or Configure Outputs
- Water sampler
- TCP/IP ports – can set up in Configure Inputs or Configure Outputs
- Miscellaneous
- Pump control (SBE 9plus with pump control option only)

**Configure Outputs**

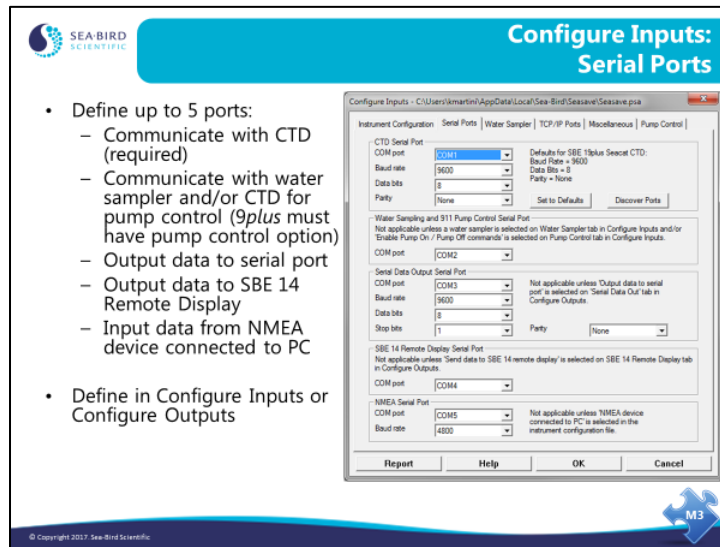
- Serial data output
- Shared file output
- Mark variable selection
- TCP/IP output
- SBE 11plus alarms – pressure, altimeter, bottom contact switch
- SBE 14 Remote display / alarms – pressure, altimeter, bottom contact switch
- PC alarms – pressure, altimeter, bottom contact switch
- Header form / prompts
- Diagnostics

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We'll talk about most of these briefly.

## Seasave: Configuring Serial Ports



We'll start by looking at each tab in **Configure Inputs**.

Entries for CTD Serial Port are always required. The other entries are ignored if the applicable input or output is not enabled.

### CTD Serial Port

- For the SBE 11*plus* Deck Unit, this is the COM port connected to the *SBE 11 Interface* connector.
- For the SBE 33 or 36 Deck Unit, this is the COM port connected to the *Serial Data* connector
- If you're not using a Deck Unit, this is the COM port connected to the CTD.

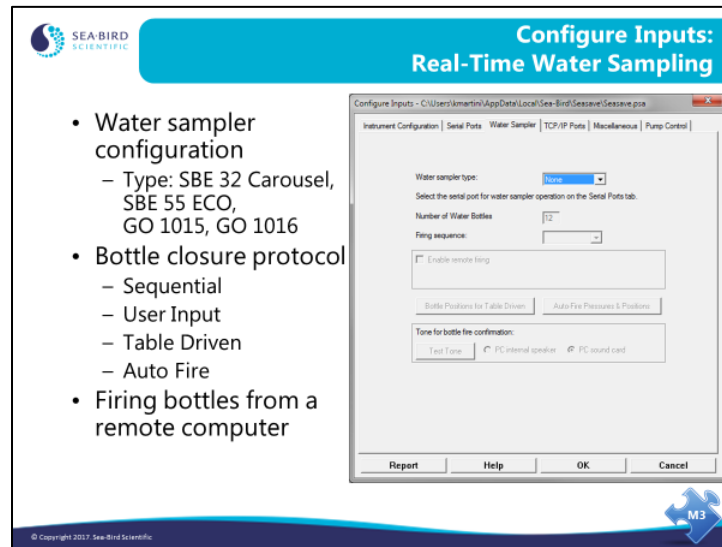
### Water Sampler / 911 Pump Control Serial Port

- For the SBE 11*plus* Deck Unit, this is the COM port connected to the *Modem Channel* connector.
- For the SBE 33 Deck Unit, this is the COM port connected to the *Carousel Data* connector.

NMEA Serial Port – Seasave can acquire data from a NMEA device connected directly to your PC (instead of to a Sea-Bird deck unit or interface box).

Serial Ports can be defined in Configure Inputs or in Configure Outputs – changes you make in one dialog box are automatically shown in the other.

## Seasave: Configuring Water Sampling



- Water sampler configuration
  - Type: SBE 32 Carousel, SBE 55 ECO, GO 1015, GO 1016
- Bottle closure protocol
  - Sequential
  - User Input
  - Table Driven
  - Auto Fire
- Firing bottles from a remote computer

There are several choices for **bottle closure protocols**:

- Sequential – When commanded to fire, bottles are fired in order of position (1, 2, 3, etc.).
- User Input - When commanded to fire, Seasave prompts you to select which bottle to fire.
- Table Driven – When commanded to fire, bottles are fired in order pre-defined by the user-input table (click Bottle Positions for Table Driven button to input the bottle positions).
- Auto Fire – Fire bottles automatically at user-input, pre-defined pressures or depth, *on upcast* (click Auto-Fire Pressures & Positions button to input the parameters).

Auto Fire Notes:

1. Seasave allows manual firing of some bottles along with auto firing of other bottles, referred to as *mixed mode* firing.
2. Seasave allows auto fire on downcast with the use of a command line parameter, `-autofireondowncast`.

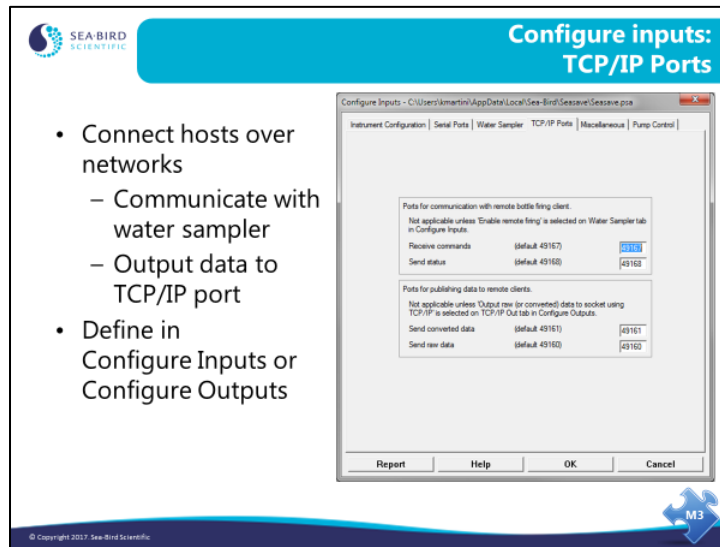
Don't forget to select the desired COM port for communication with the water sampler on the Serial Ports tab!

If you enable **remote firing**, you can control bottle closures from a remote computer through TCP/IP ports, instead of as defined by the Firing Sequence.

- Sea-Bird provides a software program, Seasave Remote, to display data on the remote computer and to fire bottles from the remote computer.

Don't forget to select the desired TCP/IP ports for communication with the water sampler on the TCP/IP Ports tab!

## Seasave: Configuring TCP/IP Ports



TCP/IP (Transmission Control Protocol / Internet Protocol) is a set of communications protocols used for the Internet and other similar networks. Transmission of Seasave data via TCP/IP allows you to view real-time data and to fire water sampler bottles at a remote computer on the ship.

Entries for ports are ignored if the applicable input or output is not enabled.

TCP/IP Ports can be defined in Configure Inputs or in Configure Outputs – changes you make in one dialog box are automatically shown in the other.

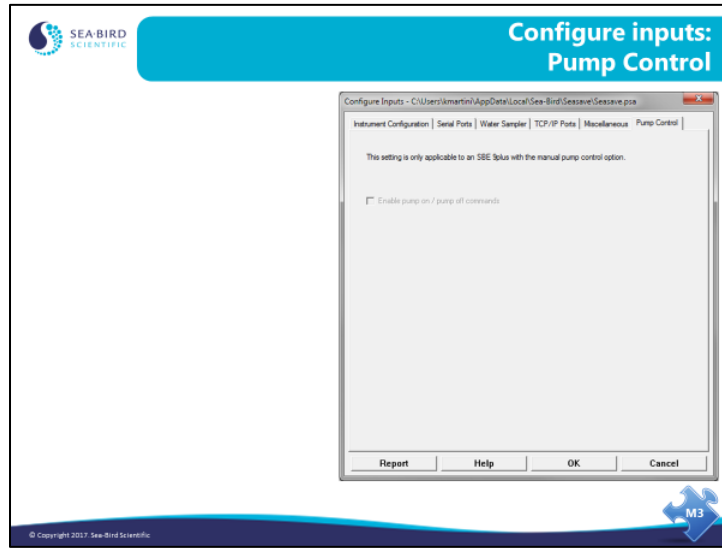
## Seasave: Defining Miscellaneous Parameters

- These parameters are needed to calculate specific variables
- Entries are used only if outputting associated variable to display window, shared file, remote device, TCP/IP port, etc.

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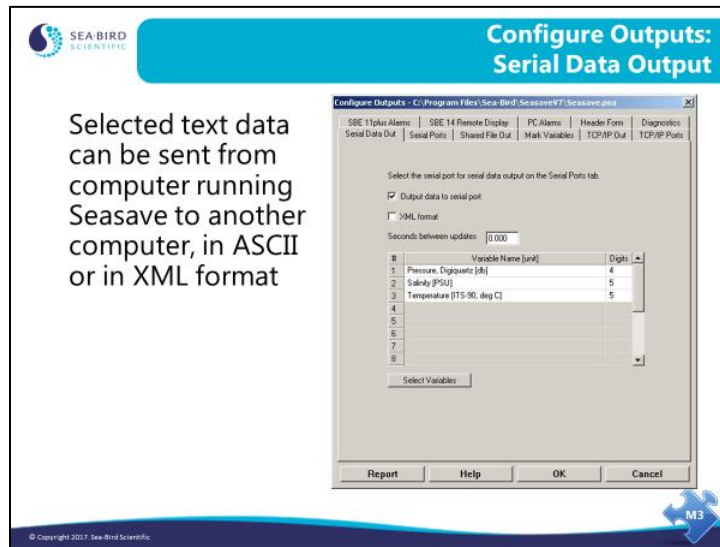
The Miscellaneous tab defines parameters required for output of specific variables. These entries are used only if you are outputting the associated variable to a display window, shared file, remote device, TCP/IP port, etc. For example, if you do not select Oxygen as an output variable for a display window or on any tab in the Configure Outputs dialog box, Seasave ignores the value entered here for Oxygen window size.

## Seasave: Pump Control





## Seasave: Configuring Serial Data Output



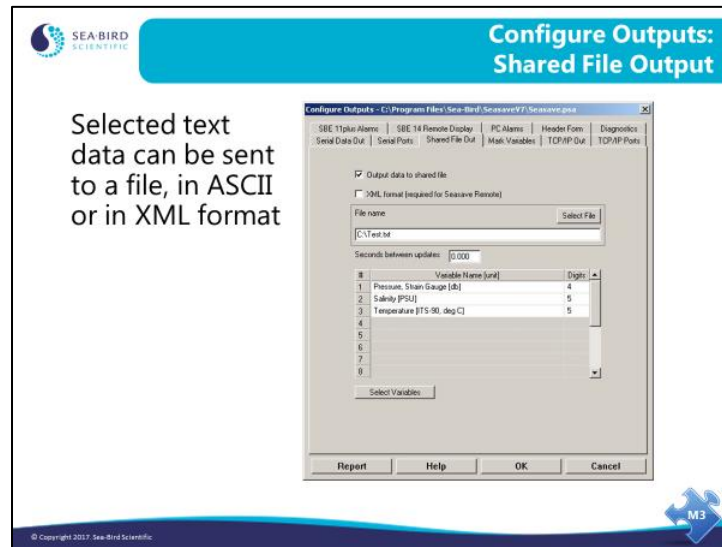
Now let's look at each tab in **Configure Outputs**.

An ASCII stream of data can be sent out via a spare serial port on your computer. The data scan contains parameters that you have selected, displayed to the precision you have set.

If you select *XML format*, data is output in XML instead of in ASCII.

Don't forget to select the desired COM port for serial data output on the Serial Ports tab!

## Seasave: Configuring Shared File Output



An ASCII stream of data can be sent out to a shared file on a network. The data scan contains parameters that you have selected, displayed to the precision you have set.

If you select *XML format*, data is output in XML instead of in ASCII.

- Sea-Bird provides a software program, Seasave Remote, to display data on a remote computer and to fire bottles from a remote computer. **You must select XML format if planning to use Seasave Remote to view data on a remote computer.**

## Seasave: Configuring Mark Variables

The screenshot displays two windows from the Seasave software. The main window is titled 'Configure Outputs: Mark Variable Selection' and shows a list of variables to be selected for marking. The 'Mark Scan Control' window is also visible, showing a '# Marks: 0' field and a 'Mark Scan' button.

- Mark variables are placed onto real-time plot when *Mark Scan* is clicked
  - Used to annotate plot at points of interest

#	Variable Name (unit)	Digits
1	Piezoe. Shear Gauge (dB)	4
2	Salinity (PSU)	5
3	Temperature (TS-90, deg C)	5
4		
5		
6		
7		
8		

Buttons: Report, Help, OK, Cancel

Buttons: # Marks: 0, Mark Scan

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*Mark Variables* annotate a real-time plot with operator-chosen parameters. When *Mark Scan* is clicked, a line is placed across the plot and the requested variables are written on the line. A file is also created with a *.mrk* extension. This file contains a line for each mark with the selected mark variables.

## Seasave: Configuring TCP/IP Output

- Selected text data can be sent from computer running Seasave to another location on network, in ASCII or in XML format


ASCII data (raw and/or converted data) can be sent out using the TCP/IP ports. For converted data, the data scans contain parameters that you have selected, displayed to the precision you have set.

If you select *XML format*, data is output in XML instead of in ASCII.

- Sea-Bird provides a software program, Seasave Remote, to display data on a remote computer and to fire bottles from a remote computer. **You must select converted data and XML format if planning to use Seasave Remote to view data on a remote computer.**


Don't forget to select the desired TCP/IP port for TCP/IP output on the TCP/IP Ports tab!


## Seasave: Configuring SBE 11*plus* Alarms



**Configure Outputs:  
SBE 11*plus* Alarms**

- Alarm (11*plus* makes an ugly noise!)
  - Pressure -- minimum and/or maximum
  - Altimeter
  - Bottom contact switch (no setup required)





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The SBE 11*plus* Deck Unit has an alarm that can be set up to operate based on minimum pressure, maximum pressure, data from an altimeter, and/or data from a bottom contact switch.

- The alarm sounds based on minimum pressure, providing a warning that the CTD is nearing the surface.
- The alarm sounds based on maximum pressure, providing a warning that the CTD is deeper than desired.
- The alarm sounds based on the output from an altimeter integrated with the 9*plus* CTD, providing a warning that the CTD is nearing the bottom. This alarm requires a set point (the height above the bottom where it sounds), a hysteresis value (keeps it from going on...off...on...off...on... as the boat rocks), and a minimum pressure to enable (to keep spurious data from setting off the alarm, like when the instrument package goes into the water).
- The alarm also sounds based on the output from a bottom contact switch integrated with the 9*plus* CTD, providing a warning that the CTD is nearing the bottom. No setup is required for the alarm to operate based on bottom contact switch data.

## Seasave: Configuring SBE 14 Remote Display

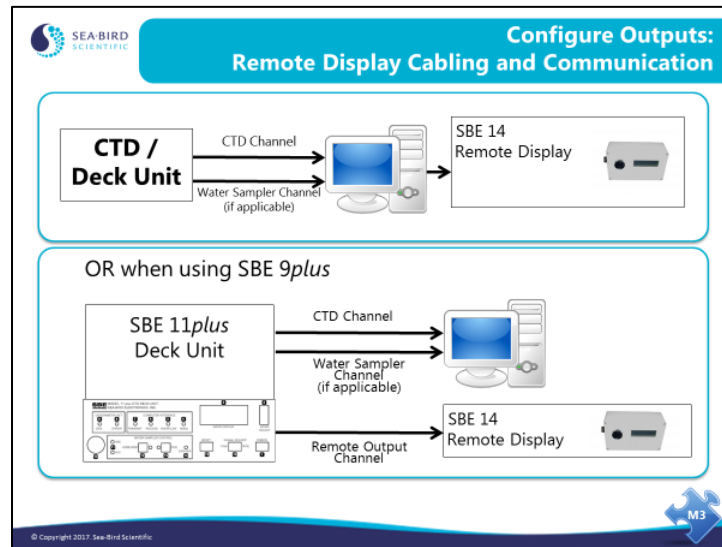
- Remote display variables are transmitted to SBE 14 in a remote location
- Alarm based on pressure, altimeter, and/or bottom contact switch data

The SBE 14 remote display receives pressure, depth, and/or altimeter data and displays it on a large, liquid-crystal display. The SBE 14 may be placed anywhere it is useful, for example: in the winch dog house, in the wet lab, on the bridge, or in the chief scientist's stateroom to name just a few. The SBE 14 also has an audible alarm that may be triggered by minimum pressure, maximum pressure, altimeter data, and/or bottom contact switch data.

Setup of the alarm parameters is similar to that for an SBE 11*plus* with one exception. If you want an alarm based on bottom contact switch data, you must enable it on this tab.

Don't forget to select the desired COM port for remote display output on the Serial Ports tab!

## Cabling a Remote Display



The SBE 14 remote display can be cabled to your system in one of two ways:

- Connected to one of the com ports on your PC (applicable to use of the SBE 14 with any of our CTDs/Deck Units, including the SBE 11*plus*), or
- Connected directly to the SBE 11*plus* – If connected this way, setup of the Remote Display is not done in Seasave; see the 11*plus* manual.

Note that the deck unit requires either a com port or a GPIB port (GPIB port only available for 11*plus*), and the water sampler requires a com port. If the remote display is connected to the computer, it requires an additional com port.

## Seasave: Configuring PC Alarms

- Set up alarms in your computer
- Alarm based on pressure, altimeter, and/or bottom contact switch data

You can also set up an audible alarm in your computer that may be triggered by minimum pressure, maximum pressure, altimeter data, and/or bottom contact switch data.

Setup of the alarm parameters is similar to that for the SBE 14 Remote Display.

After you enable one or more alarms on this tab, you can enable a *visual* alarm, in addition to the sound alarm (in the Display menu, select Alarms).



## Seasave: Configuring Cast Headers

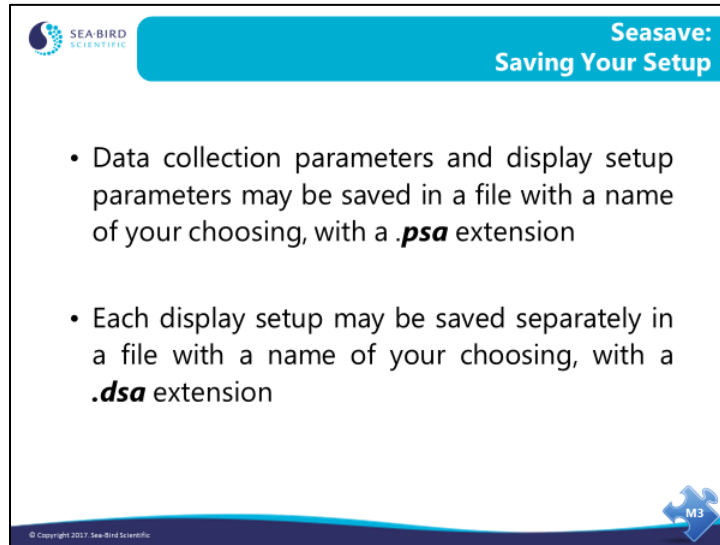
• Header form and prompts

• Information that is appended to beginning of data saved to file

• Operator may select prompts appropriate to his or her work

User headers allow the CTD operator to add annotation to the data file. This can take the form of an operator filled out table or a set of default text. The header form may be skipped altogether if desired.

## Seasave: Saving Your Setup

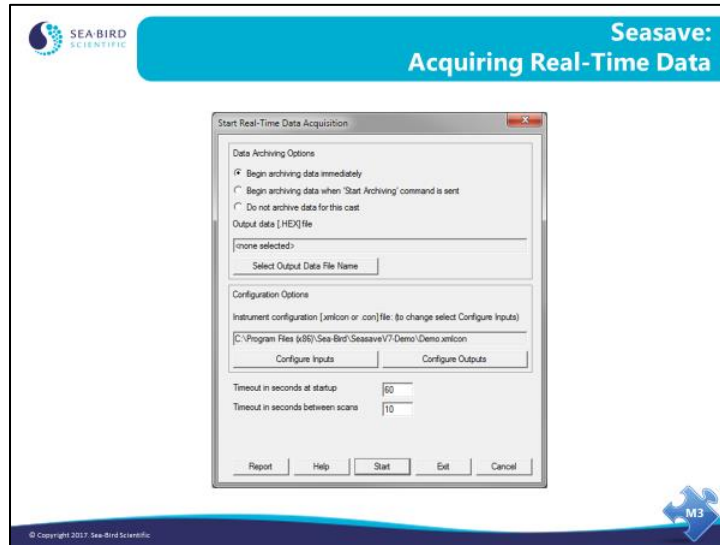


The slide features a blue header with the SEA-BIRD SCIENTIFIC logo on the left and the title 'Seasave: Saving Your Setup' on the right. The main content area is white with a blue border and contains two bullet points. At the bottom right, there is a blue puzzle piece icon with 'M3' inside. The bottom left corner has a small copyright notice: '© Copyright 2017 Sea-Bird Scientific'.

- Data collection parameters and display setup parameters may be saved in a file with a name of your choosing, with a **.psa** extension
- Each display setup may be saved separately in a file with a name of your choosing, with a **.dsa** extension

Setup files are handy for different instrument types or for pre-deployment instrument checkout *vs.* deployment display. For example, you might use fixed display or scrolled display for pre-deployment check out and then switch to a full screen plot for the cast.

## Seasave: Acquiring Real-Time Data



Click the Real-Time Data menu to get the Start Real-Time Data Acquisition dialog box.

Acquiring real-time data requires the operator to select a configuration (*.xmlcon* or *.con*) file, and decide whether or not to store data to a file and what the name of the file should be. Clicking *Start* initializes the CTD/Deck Unit, sends operator choices regarding channel suppression and averaging, and begins displaying data.

Looking at a few of the choices in the dialog box:

- Begin archiving data when ‘Start Archiving’ command is sent – This feature is useful for not saving to a file the data that is associated with deploying the CTD and soaking it near the surface for a few minutes. If you make this selection, when you click the *Start* button a dialog box with a *Start Archiving* button appears. Click the *Start Archiving* button when you are ready to begin saving data to a file (for example, when you have finished soaking). Alternatively, if you don’t enable this feature, you can remove the scans associated with the surface soak in post-processing.
- Timeout in seconds at startup – This is the maximum amount of time before the first data scan is received from the CTD; Seasave shuts down if a scan is not received within this time. Leave yourself enough time to turn on the magnetic switch.

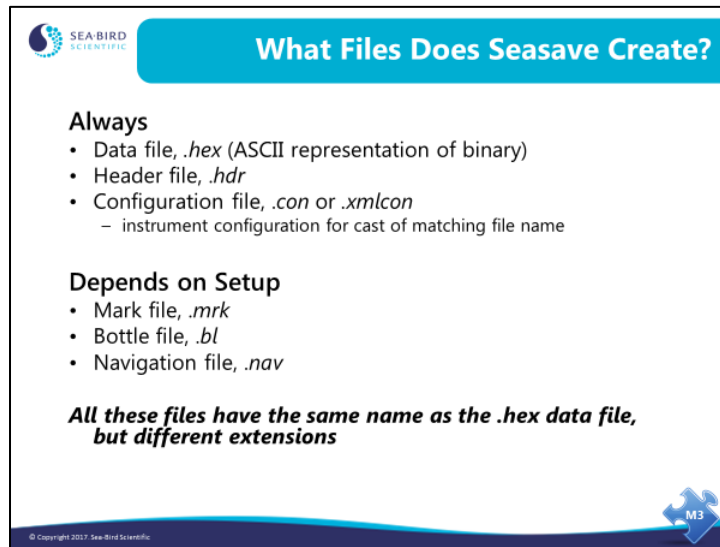
**Note: Don’t forget to configure the Com port(s) in Configure Inputs or Configure Outputs before you click *Start*!**

### **Activity: Take a Bench Cast and Collect Real-Time Data**

If Seaterm232 is still open, select *Disconnect* in Seaterm232's Communications menu to free up the COM port for communications with Seasave.

1. Click Start / Programs / Sea-Bird / SeasaveV7.
2. Check the display. Is it appropriate for conditions of the "cast"?
3. Click *Configure Inputs*.
  - A. Instrument Configuration: Open your test.con file.
  - B. Serial Ports: CTD Serial Port: COM port = port connected to CTD, Baud Rate = 9600, Data bits = 8, Parity = None; (communication parameters for other ports not applicable).
  - C. Water Sampler: Set *Water sampler type* to *None*.
  - D. Click OK.
4. Click *Configure Outputs*.
  - A. Disable all outputs (Serial Data Out, Shared File Out, etc.).
  - B. Click OK.
5. Select *Real-Time Data -> Start*.
  - A. Select *Begin archiving data immediately*.
  - B. Save data in C:\Data with file name *realtime* (C:\Data\realtime.hex).
  - C. Click *Start*.
6. Move SBE 19*plus* V2 switch to ON.

## Seasave: Output File Types



If you archive data to a file name of *MyFile*, Seasave creates the following files:

Always:

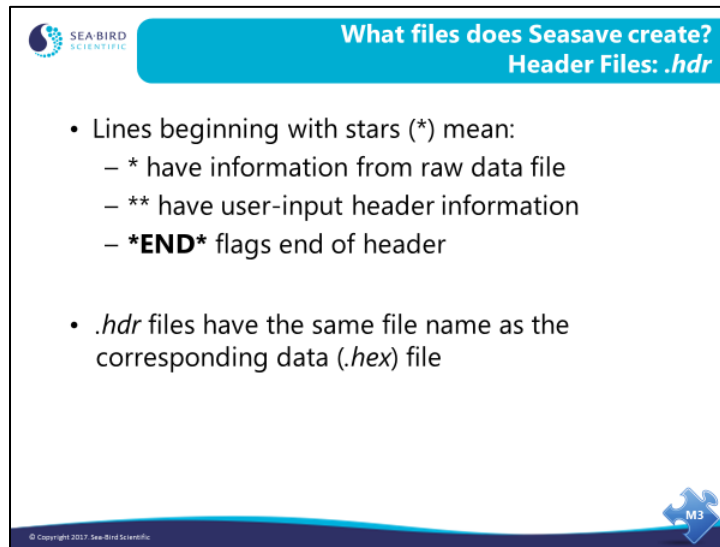
- *MyFile.hex* has an ASCII (text) representation of binary data in hexadecimal format plus the header in ASCII (text) at the beginning of the file.
- *MyFile.hdr* has the header information only, in ASCII.
- *MyFile.con* or *MyFile.xmlcon* has the instrument configuration and calibration coefficients (copied from the input instrument configuration file).

Depends on Setup:

- *MyFile.mrk* has data scans with the chosen mark file variables.
- *MyFile.bl* has scans that were collected when the water sampler bottle closure confirm was received.
- *MyFile.nav* has navigational information collected during the cast.

Note: Older versions (<6.0) of Seasave created a binary data file (*.dat*) instead of a *.hex* file during SBE 911*plus* data acquisition. *MyFile.dat* had binary data plus the header in ASCII (text) at the beginning of the file. The rest of the output files were the same as the current version of Seasave.

## Seasave: Header Files



The slide features the SEA-BIRD SCIENTIFIC logo in the top left corner. The title bar is blue with white text. The main content area is white with black text. A blue puzzle piece icon with 'M3' is in the bottom right corner. A copyright notice is at the bottom left.

**What files does Seasave create?**  
**Header Files: .hdr**


- Lines beginning with stars (\*) mean:
  - \* have information from raw data file
  - \*\* have user-input header information
  - \***END**\* flags end of header
- .hdr files have the same file name as the corresponding data (.hex) file

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Here is a sample .hdr file for a *19plus V2*:

```
* Sea-Bird SBE 19plus V2 Data File:  
* FileName = C:\Documents and Settings\dbresko.SEABIRD\My Documents\19plusV2test.hdr  
* Software Version Seasave V 7.21a  
* Temperature SN = 4022  
* Conductivity SN = 4022  
* System UpLoad Time = Dec 22 2010 09:24:52  
* Real-Time Sample Interval = 0.2500 seconds  
* System UTC = Dec 22 2010 17:24:52  
** Ship: RV TestBath  
** Cruise: test  
** Station: Bellevue WA  
*END*
```

## Seasave: Mark Files




**What files does Seasave create?**  
**Mark Files: .mrk**

- Contains 1 data scan for each time *Mark Scan* button is clicked (variables set up on Mark Variables tab of Configure Outputs)
- Same file name as data (.hex) file

```
e:\hot-101\0008A001.MRK:
  Scan  Pressure  TempP90  CondPS/m  SalnP,P
mark number 1, system time is Jan 15 1999 02:41:57
  44617  1021.872    4.1177   3.268962   34.4987
mark number 2, system time is Jan 15 1999 02:47:06
  52033   770.993     4.7046   3.294753   34.3185
```

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## Seasave: Bottle Data Files

**SEA-BIRD SCIENTIFIC**

**What files does Seasave create?**  
**Bottle Data File: .bl**

- Created when water sampling is enabled
- Contains bottle fire sequence number and position, date and time, and beginning and ending scan number corresponding to 1.5-second duration for each bottle
- Data written to .bl file each time confirm bit in data stream is set or when a confirmation is received from water sampler
- Same file name as data (.hex) file

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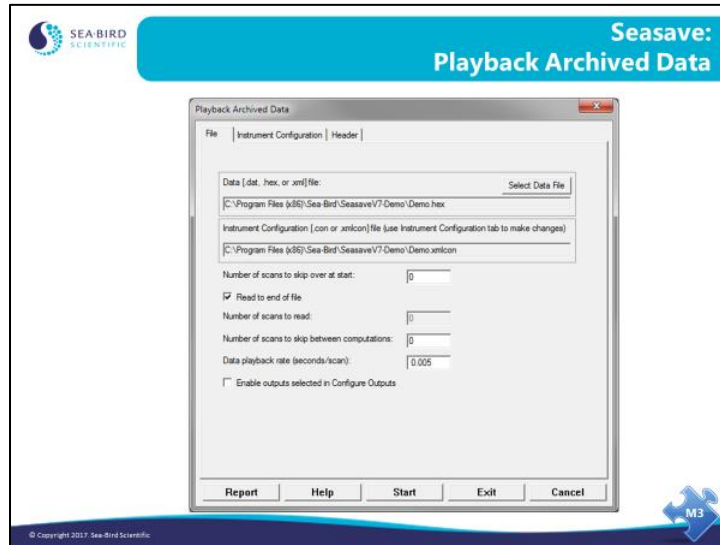
M3

Whenever a bottle confirmation is received by Seasave from either the confirm status bit or via the modem port, a line is written to the output file with a .bl extension. This contains the bottle firing sequence number, bottle position, date, time, and beginning and ending scan number for the fired bottle. It is used in data processing to build up a larger file of data parameters collected while the water sampler was being closed.

Note: A .bl file is not created if using the SBE *9plus* / *11plus* with a G.O. 1015 Rosette. For this system, Seasave instead sets a bottle confirm bit in the data each time a bottle is closed. The bottle confirm bit can also be used in data processing to build up a file of data parameters collected while the water sampler was being closed.



## Seasave: Displaying Archived Data



In the *Archived Data* menu, select *Start* to get the dialog box shown above.

You have the option of skipping data scans at the beginning of the file; this allows you to skip scans collected while the instrument was on deck and going into the water. There is also the option to skip scans when displaying the data; for very long casts this allows you to decimate the data. You can skip 1 or more seconds between scans displayed. You can play back the data at the same rate it was acquired, or you can play it back really fast (set Data playback rate to 0) to generate a plot quickly.

If desired, you can *Enable outputs selected in Configure Outputs*, such as outputs to a serial port, TCP/IP port, shared file, or SBE 14 Remote Display. If enabled, the archived data will be written to / sent to those devices / files as if real-time data was being collected at the designated data playback rate. We'll talk more about Configure Outputs in a few minutes.

## Activity: Display Bench Cast in Seasave

1. Click Start / Programs / Sea-Bird / Seasave V7.
2. Select configuration (.xmlcon) file you created:
  - A. Click *Configure Inputs*.
  - B. On Instrument Configuration tab, click *Open*. In dialog box, select .xmlcon file (test.xmlcon) and click *Open*.
  - C. Click *OK*.
3. Set up display windows to show time and temperature:
  - A. Right click on the **plot** display -> Modify  
(or, select Display menu -> Add New Plot Display Window)
    - On Plot Setup tab  
Set *Plot type* to Single Y – Multiple X, and *Number of Axes* to 2.
    - On Y axis tab  
Click *Select Variable* button, select Time, Elapsed -> seconds, click OK.  
Set *Scale Minimum* to 0 and *Maximum* to 600.
    - On X-Axis 1 tab  
Click *Select Variable* button, select Temperature -> ITS-90 -> deg C, click OK.  
Set *Scale Minimum* to 20 and *Maximum* to 25.  
Click *OK*.
  - B. Right click on the **scrolled** display -> Modify  
(or, select Display menu -> Add New Scrolled Display Window)
    - Click *Delete All*.
    - With 1st row in the table highlighted, double click Time, Elapsed -> seconds.
    - With 2nd row in the table highlighted, double click Temperature -> ITS-90 -> deg C.
    - Set *Digits* (right of decimal place) to 0 for time, 3 for temperature.  
Click *OK*.
  - C. If desired, set up the **fixed** display. The method is the same as for the scrolled display.
4. Click *Archived Data, Start*
  - A. Select .hex data file uploaded from memory (C:\Data\intrec.hex).
  - B. Select .con configuration file you created (C:\Data\test.xmlcon).
  - C. Set *number of scans to skip over at start* to 0.
  - D. Click *Start*.