



Real-Time Data — Seasave

- Instrument configuration
 - What kind of instrument
 - How many sensors
 - What type of sensors
 - Communication issues
 - Which computer interface
 - What data transmission protocol
- How does Seasave know all this stuff?



Setup Parameters Stored in Configuration (*.con* or *.xmlcon*) File

- Configuration data is stored in a file (for example, seasoft.con)
- In addition, calibration coefficients are stored in this file
- You may edit *.con* or *.xmlcon* file directly from Seasave or the data processing software (SBE Data Processing) we will discuss later in the course



Instrument Configuration

Configure Inputs - C:\Documents and Settings\dresko.SEABIRD\My Documents\IS...

Instrument Configuration | Serial Ports | Water Sampler | TCP/IP Ports | Miscellaneous | Pump Control

Open Create Modify

Configuration file opened	9plustest.con
Instrument type	911plus/917plus CTD
Frequency channels suppressed	0
Voltage words suppressed	0
Deck unit or SEARAM	SBE11plus Firmware Version >= 5.0
Computer interface	RS-232C
Scans to average	1
NMEA position data added	No
NMEA depth data added	No
NMEA time added	No
Surface par voltage added	No
Scan time added	No
Channel	Sensor
1. Frequency	Temperature
2. Frequency	Conductivity
3. Frequency	Pressure, Digiquartz with TC
4. Frequency	Free
5. Frequency	Free
6. A/D voltage 0	Oxygen, SBE 43
7. A/D voltage 1	Oxygen, SBE 43, 2

Report Help OK Cancel



Examining the Configuration File

Configuration for the SBE 911plus/917plus CTD

Configuration file opened: 9plustest.con

Frequency channels suppressed Voltage words suppressed

Deck unit or SEARAM

Computer interface

Scans to average

NMEA position data added NMEA depth data added
 NMEA device connected to deck unit NMEA time added
 NMEA device connected to PC

Surface PAR voltage added Scan time added

Channel	Sensor
1. Frequency	Temperature
2. Frequency	Conductivity
3. Frequency	Pressure, Digiquartz with TC
4. Frequency	Free
5. Frequency	Free
6. A/D voltage 0	Oxygen, SBE 43
7. A/D voltage 1	Oxygen, SBE 43, 2
8. A/D voltage 2	Altimeter
9. A/D voltage 3	Free
10. A/D voltage 4	Free
11. A/D voltage 5	Free
12. A/D voltage 6	Free

Buttons: Report... Help... Exit Cancel

Temperature

Serial number

Calibration date

G

H

I

J

F0

Slope

Offset

Use A-D

Buttons: Import Export OK Cancel

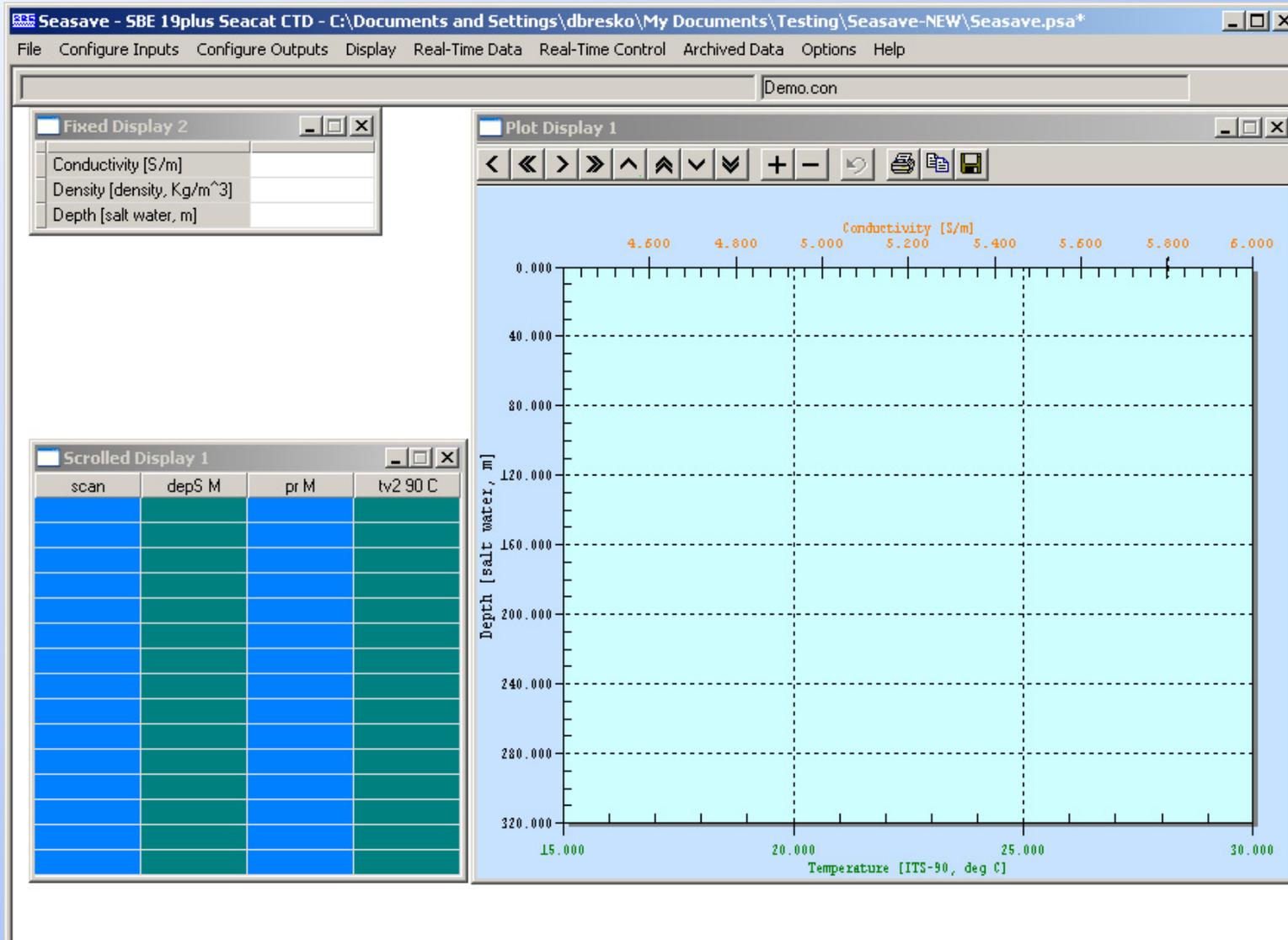


Activity: Set Up Seasave .con File

- Set up a configuration (.con or .xmlcon) file your SBE 19*plus* V2 in Seasave V7; see notes for instructions



Default Display for Seasave





Archived Data Dialog

Playback Archived Data

File | Instrument Configuration | Header

Data [.Dat or .Hex] file: Select Data File

C:\Data\Module3\SBE19plus\Miami.hex

Instrument Configuration [.con or .xmlcon] file (use Instrument Configuration tab to make changes)

C:\Data\Module3\SBE19plus\Miami.con

Number of scans to skip over at start:

Read to end of file

Number of scans to read:

Number of scans to skip between computations:

Data playback rate (seconds/scan):

Enable outputs selected in Configure Outputs

Report **Help** **Start** **Exit** **Cancel**



Activity: Display Bench Cast

- Use Seasave to display the data that you collected in memory in your *19plus* V2; ; see notes for instructions



Things to Configure for Real-Time Data Collection

Configure Inputs

- Instrument configuration (.con 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



Serial Ports

- Define up to 5 ports:
 - Communicate with CTD (required)
 - Communicate with water sampler and/or CTD for pump control (*9plus* must have pump control option)
 - Output data to serial port
 - Output data to SBE 14 Remote Display
 - Input data from NMEA device connected to PC
- Define in Configure Inputs or Configure Outputs

Configure Inputs - C:\Documents and Settings\ldbresko\Application Data\Sea-Bir...

Instrument Configuration | Serial Ports | Water Sampler | TCP/IP Ports | Miscellaneous | Pump Control

CTD Serial Port

COM port: COM1

Baud rate: 19200

Data bits: 8

Parity: None

Defaults for SBE 911plus CTD with RS-232C:
Baud Rate = 19200
Data Bits = 8
Parity = None

Set to Defaults

Water Sampling and 911 Pump Control Serial Port

Not applicable unless a water sampler is selected on Water Sampler tab in Configure Inputs and/or 'Enable Pump On / Pump Off commands' is selected on Pump Control tab in Configure Inputs.

COM port: COM2

Serial Data Output Serial Port

COM port: COM3

Baud rate: 9600

Data bits: 8

Stop bits: 1

Parity: None

Not applicable unless 'Output data to serial port' is selected on 'Serial Data Out' tab in Configure Outputs.

SBE 14 Remote Display Serial Port

Not applicable unless 'Send data to SBE 14 remote display' is selected on SBE 14 Remote Display tab in Configure Outputs.

COM port: COM4

NMEA Serial Port

COM port: COM5

Baud rate: 4800

Not applicable unless 'NMEA device connected to PC' is selected in the instrument configuration file.

Report | Help | OK | Cancel



Real-Time 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

A screenshot of a software window titled "Configure Inputs - C:\Documents and Settings\ldbresko\Application Data\Sea-Bir...". The window has a tabbed interface with the following tabs: "Instrument Configuration", "Serial Ports", "Water Sampler", "TCP/IP Ports", "Miscellaneous", and "Pump Control". The "Water Sampler" tab is currently selected. The configuration options within this tab are:

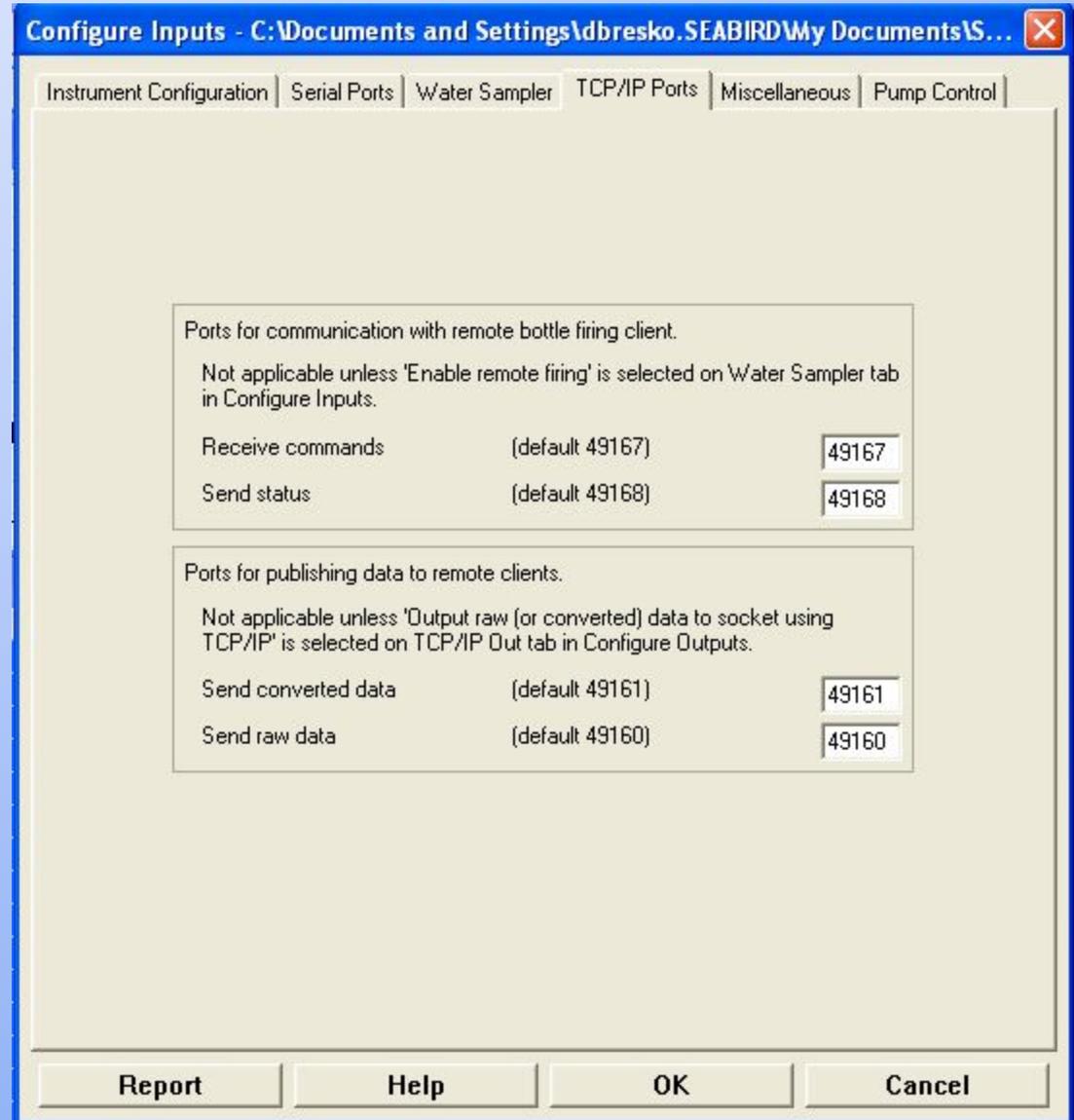
- "Water sampler type:" with a dropdown menu set to "SBE Carousel".
- A text instruction: "Select the serial port for water sampler operation on the Serial Ports tab."
- "Number of Water Bottles" with a text input field containing "12".
- "Firing sequence:" with a dropdown menu set to "Sequential".
- An unchecked checkbox labeled "Enable remote firing".
- Two buttons: "Bottle Positions for Table Driven" and "Auto-Fire Pressures & Positions".
- "Tone for bottle fire confirmation:" with a "Test Tone" button and two radio buttons: "PC internal speaker" (unselected) and "PC sound card" (selected).

At the bottom of the window are four buttons: "Report", "Help", "OK", and "Cancel".



TCP/IP Ports

- Connect hosts on Internet and/or over networks
 - Communicate with water sampler
 - Output data to TCP/IP port
- Define in Configure Inputs or Configure Outputs





Miscellaneous

- 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.

Configure Inputs - C:\Documents and Settings\dresko\Application Data\Sea-Bir...

Instrument Configuration | Serial Ports | Water Sampler | TCP/IP Ports | Miscellaneous | Pump Control

This tab configures miscellaneous data for calculations.
Note: Values entered only affect indicated calculations.

Depth and Average Sound Velocity
Latitude when NMEA is not available: 0

Average Sound Velocity
Minimum pressure [db]: 20
Minimum salinity [psu]: 20
Pressure window size [db]: 20
Time window size [s]: 60

Plume Anomaly
Theta-B: 0
Salinity-B: 0
Theta-Z / Salinity-Z: 0
Reference pressure [db]: 0

Potential Temperature Anomaly
A0: 0 A1: 0 A1 Multiplier: Salinity

Oxygen
Window size [s]: 2
 Apply Tau correction
 Apply hysteresis correction to SBE 43 when Sea-Bird equation selected in instrument configuration file

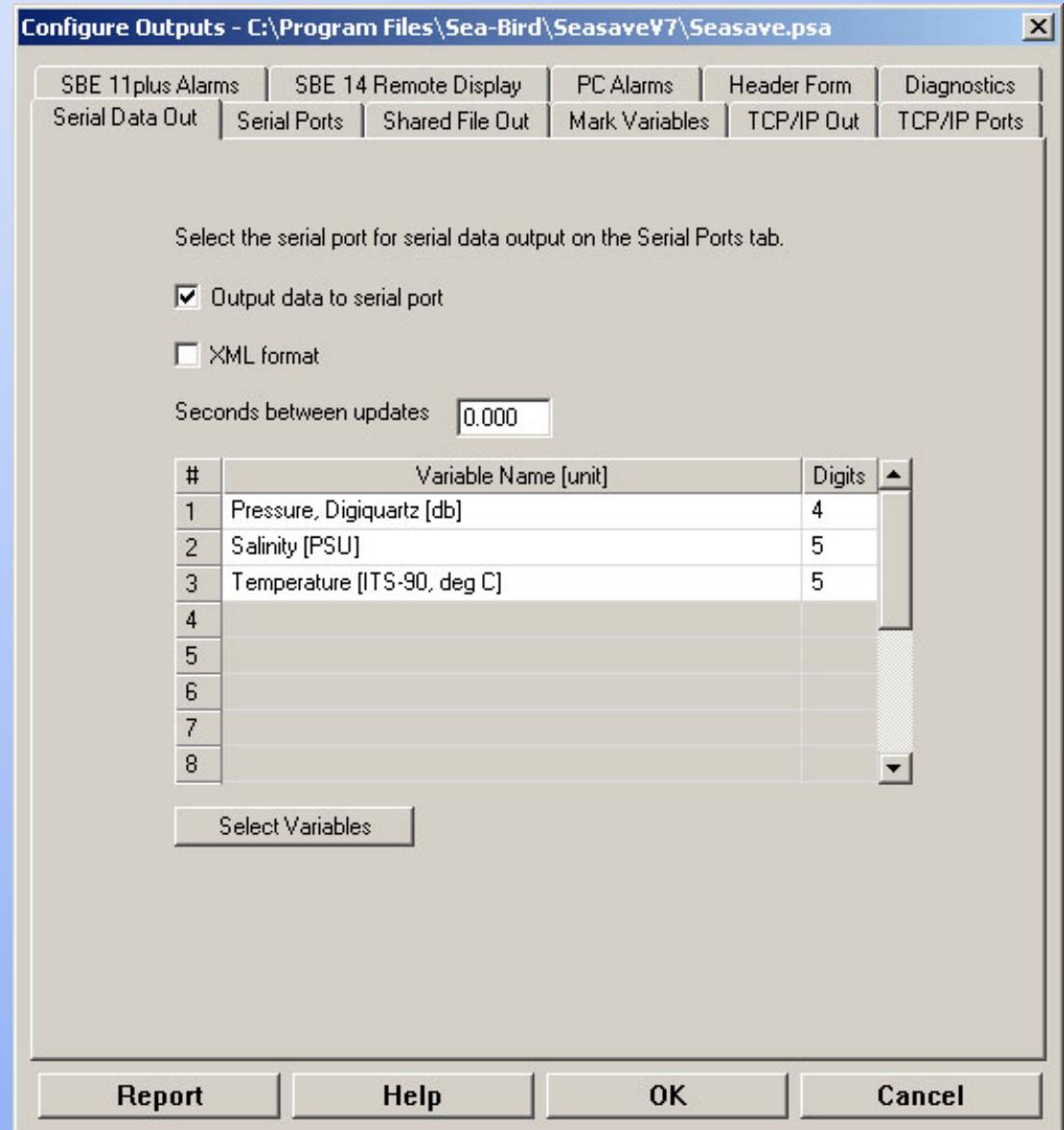
Descent and Acceleration
Window size [s]: 2 Set to Defaults

Report Help OK Cancel



Serial Data Output

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





Shared File Output

- Selected text data can be sent to a file, in ASCII or in XML format

Configure Outputs - C:\Program Files\Sea-Bird\SeasaveV7\Seasave.psa

SBE 11plus Alarms | SBE 14 Remote Display | PC Alarms | Header Form | Diagnostics
Serial Data Out | Serial Ports | Shared File Out | Mark Variables | TCP/IP Out | TCP/IP Ports

Output data to shared file
 XML format (required for Seasave Remote)

File name
C:\Test.txt

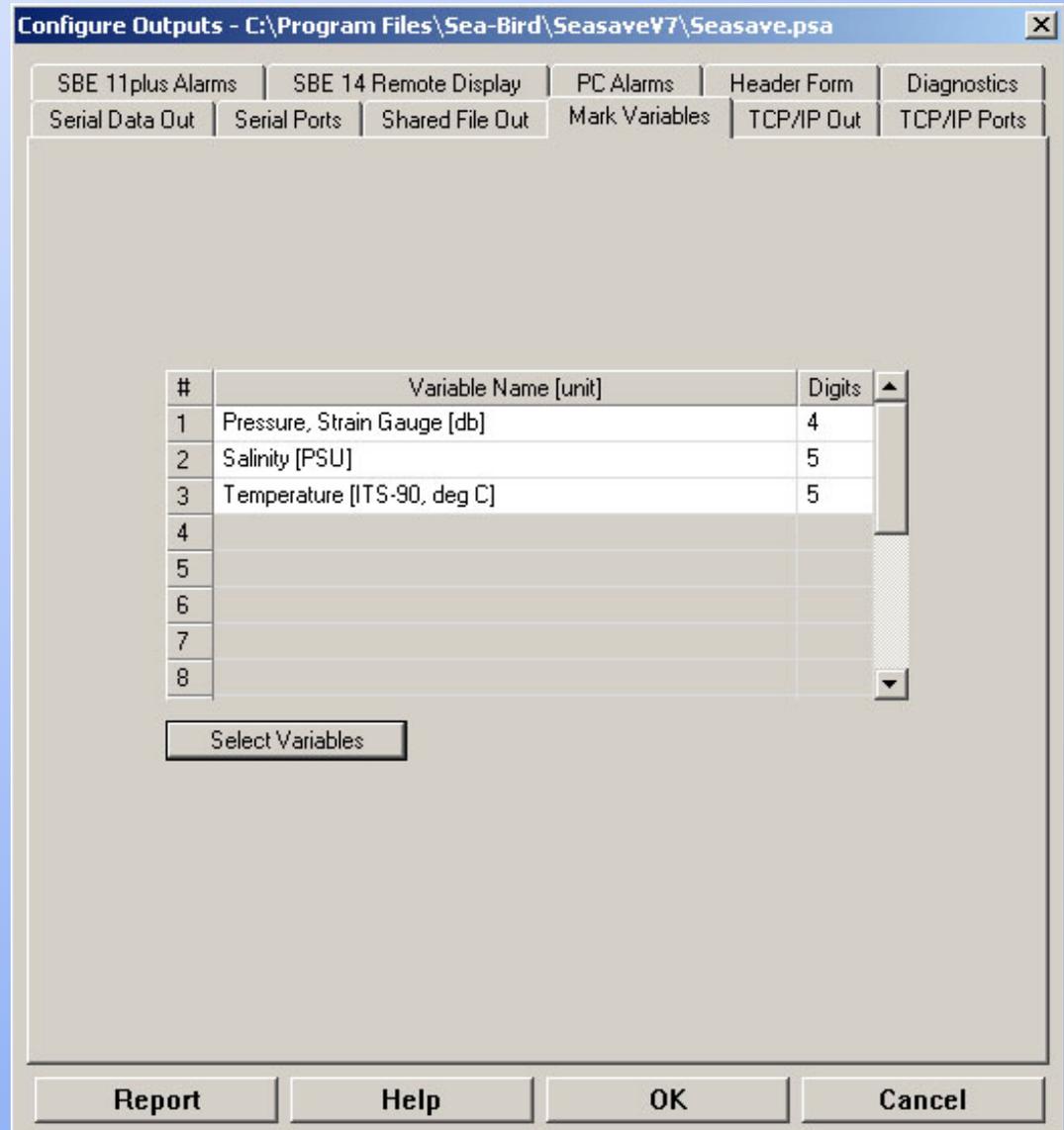
Seconds between updates

#	Variable Name [unit]	Digits
1	Pressure, Strain Gauge [db]	4
2	Salinity [PSU]	5
3	Temperature [ITS-90, deg C]	5
4		
5		
6		
7		
8		



Mark Variable Selection

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





TCP/IP Output

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

Configure Outputs - C:\Program Files\Sea-Bird\SeasaveV7\Seasave.psa

SBE 11plus Alarms | SBE 14 Remote Display | PC Alarms | Header Form | Diagnostics
Serial Data Out | Serial Ports | Shared File Out | Mark Variables | TCP/IP Out | TCP/IP Ports

Select the TCP/IP ports on the TCP/IP Ports tab.

Raw data

Output raw data to socket using TCP/IP
 XML wrapper and settings
Seconds between raw data updates: 0.000

Converted data

Output converted data to socket using TCP/IP
 XML format (required for Seasave Remote)
Seconds between converted data updates: 0.000

#	Variable Name [unit]	Digits
1	Pressure, Strain Gauge [db]	4
2	Salinity [PSU]	5
3	Temperature [ITS-90, deg C]	5
4		
5		
6		
7		
8		

Select Variables

Report | Help | OK | Cancel



SBE 11*plus* Alarms

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

Configure Outputs - C:\Program Files\Sea-Bird\SeasaveV7\Seasave.psa

Serial Data Out | Serial Ports | Shared File Out | Mark Variables | TCP/IP Out | TCP/IP Ports
SBE 11plus Alarms | SBE 14 Remote Display | PC Alarms | Header Form | Diagnostics

Enable minimum pressure alarm
Sound alarm when pressure is less than (decibars)

Enable maximum pressure alarm
Sound alarm when pressure is greater than (decibars)

Enable altimeter alarm
Alarm set point (meters)
Alarm hysteresis (meters)
Minimum pressure to enable alarm (decibars)

Alarm for a bottom contact switch on SBE 9plus is automatically enabled. No setup is required.

Report Help OK Cancel



SBE 14 Remote Display

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

Configure Outputs - C:\Program Files\Sea-Bird\SeasaveV7\Seasave.psa

Serial Data Out | Serial Ports | Shared File Out | Mark Variables | TCP/IP Out | TCP/IP Ports
SBE 11plus Alarms | SBE 14 Remote Display | PC Alarms | Header Form | Diagnostics

Send data to SBE 14 remote display
Select the serial port for SBE 14 Remote Display on the Serial Ports tab.

Remote display data type: Depth
Depth type: Salt water
Seconds between updates: 1

Enable minimum pressure alarm
Sound alarm when pressure is less than (decibars): 20

Enable maximum pressure alarm
Sound alarm when pressure is greater than (decibars): 1000

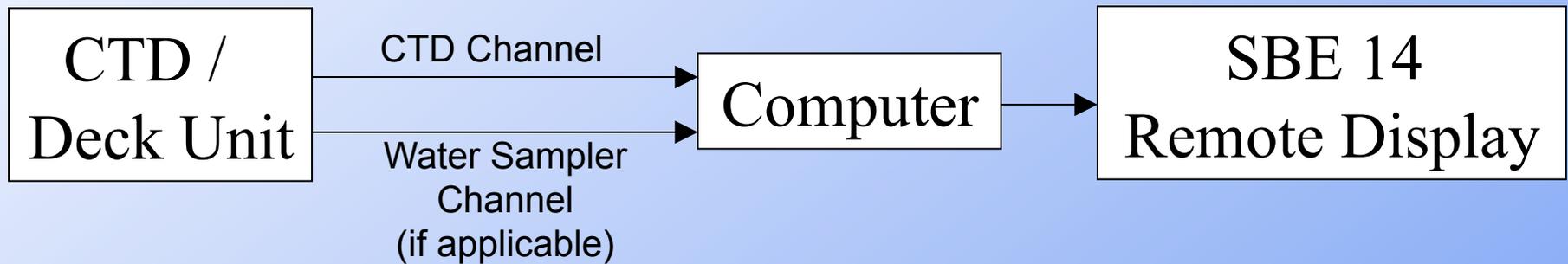
Enable altimeter alarm
Alarm set point (meters): 10
Alarm hysteresis (meters): 1
Minimum pressure to enable alarm (decibars): 20

Enable bottom contact switch alarm

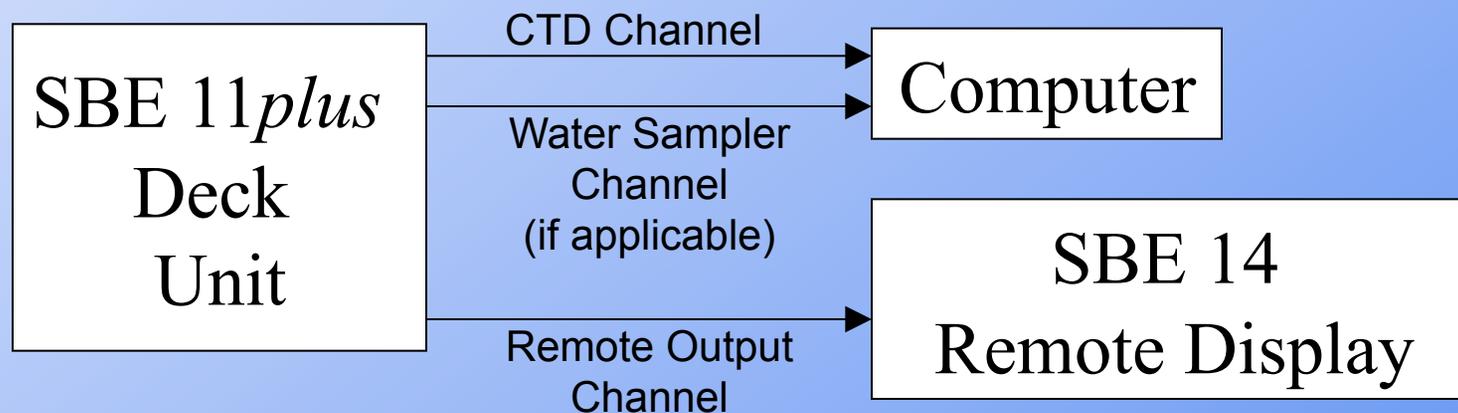
Report | Help | OK | Cancel



Remote Display Cabling and Communication



OR





PC Alarms

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

The screenshot shows a Windows-style dialog box titled "Configure Outputs - C:\Program Files\Sea-Bird\SeasaveV7\Seasave.psa". It has a tabbed interface with the following tabs: "Serial Data Out", "Serial Ports", "Shared File Out", "Mark Variables", "TCP/IP Out", "TCP/IP Ports", "SBE 11plus Alarms", "SBE 14 Remote Display", "PC Alarms", "Header Form", and "Diagnostics". The "PC Alarms" tab is selected. The dialog contains several sections for configuring alarms:

- Enable minimum pressure alarm
Sound alarm when pressure is less than (decibars)
- Enable maximum pressure alarm
Sound alarm when pressure is greater than (decibars)
- Enable altimeter alarm
Alarm set point (meters)
Alarm hysteresis (meters)
Minimum pressure to enable alarm (decibars)
- Enable bottom contact switch alarm

At the bottom, there is a section for "Tone for alarms:" with a "Test Alarm" button and two radio buttons: "PC internal speaker" (unselected) and "PC sound card" (selected).

At the very bottom of the dialog are four buttons: "Report", "Help", "OK", and "Cancel".



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

Configure Outputs - C:\Program Files\Sea-Bird\SeasaveV7\Seasave.psa

Serial Data Out | Serial Ports | Shared File Out | Mark Variables | TCP/IP Out | TCP/IP Ports
SBE 11plus Alarms | SBE 14 Remote Display | PC Alarms | Header Form | Diagnostics

Header Choice: Prompt for Header Information

Prompt for line # 01: Ship:

Prompt for line # 02: Station:

Prompt for line # 03: Operator:

Prompt for line # 04: Latitude:

Prompt for line # 05: Longitude:

Prompt for line # 06:

Prompt for line # 07:

Prompt for line # 08:

Prompt for line # 09:

Prompt for line # 10:

Prompt for line # 11:

Prompt for line # 12:

Report | Help | OK | Cancel



Saving Your Setup

- 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



Acquiring Real-Time Data

Start Real-Time Data Acquisition [X]

Data Archiving Options

- Begin archiving data immediately
- Begin archiving data when 'Start Archiving' command is sent
- Do not archive data for this cast

Output data [.HEX] file

C:\Data\Module3\SBE19plus\test.hex

Select Output Data File Name

Configuration Options

Instrument configuration [.xmlcon or .con] file: (to change select Configure Inputs)

C:\Data\Module3\SBE19plus\Miami.con

Configure Inputs Configure Outputs

Timeout in seconds at startup 10

Timeout in seconds between scans 10

Report Help Start Exit Cancel



What Files Does Seasave Create?

Always

- Data file, *.hex* (ASCII representation of binary)
- Header file, *.hdr*
- Configuration file, *.con* or *.xmlcon*
 - instrument configuration for cast of matching file name

Depends on Setup

- Mark file, *.mrk*
- Bottle file, *.bl*
- Navigation file, *.nav*

*All these files have the same name as the .hex data file,
but different extensions*



Header Files: *.hdr*

- Lines beginning with:
 - * have information from raw data file
 - ** have user-input header information
 - ***END*** flags end of header
- Same file name as data (*.hex*) file



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



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

Real-Time Data With Internally Recording Instruments

- SBE 19, *19plus*, *19plus V2*, or 25 may be used for real-time data; casts are recorded in instrument memory as well as on a computer by Seasave
- One method is to connect CTD directly to computer
 - For 1600 m sea cables and low baud rates (600 baud)
 - SBE 19 requires optional optical isolation for communication lines
- Another method is to deploy CTD with:
SBE 33 Deck Unit and SBE 32 Carousel Water Sampler, or
SBE 33 Deck Unit and SBE 55 ECO Water Sampler, or
SBE 36 Deck Unit and PDIM
 - For 10,000 m sea cables



Instrument Preparation for Real-Time Data Collection

- Check memory, clear if necessary
- Check batteries, replace if necessary
- Put instrument to sleep (QS)
 - SBE 19 and 25 do not perceive the magnetic switch if they are already awake



Real-Time Data For Internal Recording With Water Sampling

- Water sampling requires SBE 33 Carousel Deck Unit and interface option in SBE 32 Carousel Water Sampler
 - Interface option in SBE 32 provides power at underwater package and telemetry similar to *9plus*
 - Allows data transmission over 10 km sea cables
- Or, use SBE 33 Carousel Deck Unit with standard SBE 55 ECO Water Sampler; same capabilities as SBE 33 / SBE 32 system described above



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

- Use Seasave to collect and display real-time data from your SBE 19*plus* V2; see notes for instructions