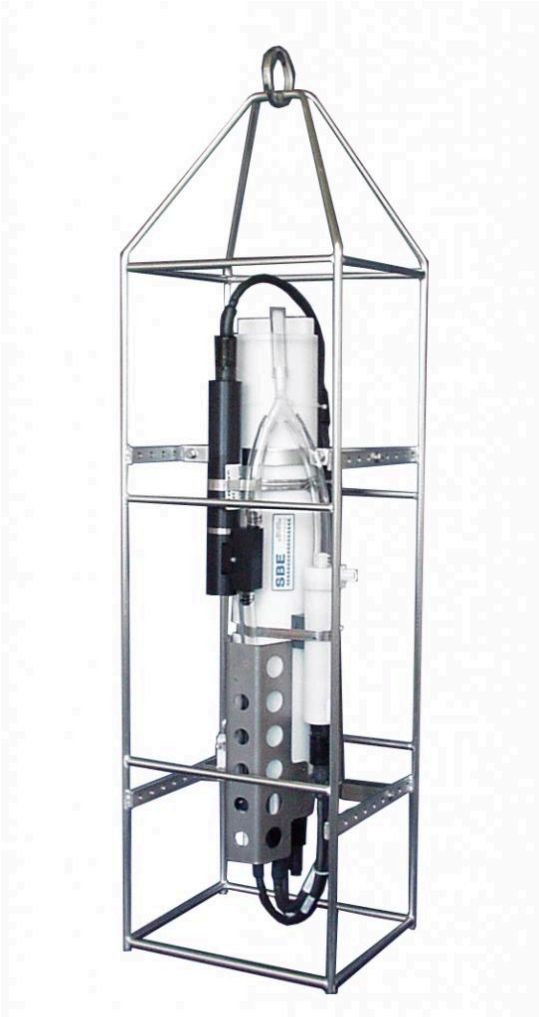
STANDARD OPERATION PROTOCOL
Seabird 19plus V2



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Initializing

1. Plug Seabird Cord into the windows laptop (Mac does not work for the SBE).
    - The CTD power cord is tied to the top square of the CTD structure. Twist off housing and pull plug apart. Plug male end coming from CTD into computer interface cord. Plug USB into computer.
2. Open **Seaterm V2** (should be located on desktop).
3. Select "C. **SBE 19plus V2**".
4. When the CTD is connected you will get code in the "**Serial Port**" box and a list of tabs with commands in the "**Send Commands**" box on the left. The bottom row of the code will say "**<Executed/>**". If nothing comes up see troubleshooting page at end of protocol.
5. Periodically, the CTD will timeout and you will need to go to "Communications" and then select "Disconnect and reconnect".
6. Within the "Serial Port" box type "GetSD". This will give you information on the CTD diagnostics and battery voltage.
7. vMain must be > 12.4 volts for short days shallow drops (eg. 3 drops at 60m) or >12.8 volts for multiple deep drops (eg. 4 drops at 200m). Change batteries for the multi-day surveys. See change battery protocol for instructions.
8. Type **DS**. (spits out similar info).
9. On the left hand side, under the commands find and select **General setup.**
10. Highlight **Initialize logging. (This will delete any data stored on the seabird – make sure everything has been uploaded – check CTD-incoming folder)**
11. Hit **execute** twice.
12. The CTD is ready for the next survey.
13. Disconnect CTD from computer and spray the CTD male plug ends with "Underwater Connector Lubricant" and reconnect.

Download and Initialization

Download

- Plug Seabird Cord into the Windows laptop (the mac does not work for the SBE).
    - The CTD power cord is tied to the top of the CTD. Twist off housing and pull plug apart. Plug male end coming from CTD into computer interface cord. Plug USB into computer.
- Open **Seaterm V2 – Shortcut** located on desktop.
- Select "C. **SBE 19plus V2**".
- When the CTD is connected you will get code in the "**Serial Port**" box and a list of tabs with commands in the "**Send Commands**" box on the left. The bottom row of the code will say "**<Executed/>**". If nothing comes up see troubleshooting page at end of protocol.
- Select **Output Format Setup** (in "Send Commands" box – left side of screen).
- Select **Set Data Output Format**, and ensure that the format is **Raw Hex(0)**.
- Click **Execute.**
- Click **Upload** at the top of the window – lots of text will show up and a "Save as" box will appear.
- Save the files into the "CTD-Incoming folder" on the google drive.
- Another window will pop up ("Upload data"); you don't need to change anything, but make sure under "**Upload data options**" (halfway down) that **all data separated by cast** is selected. Click **Upload.**
- Wait until the data upload is complete. The bottom left hand corner of the window will say "**Upload complete.**" This will take a few minutes.
- Fill out the "CTD Quality Control Log" located in the bookmarks tab.

Initialize

14. Within the "Serial Port" box type "GetSD". This will give you information on the CTD diagnostics and battery voltage.
15. vMain must be > 12.4 volts for short days shallow drops (eg KWAK 3 x 60m) or >12.8 volts for multiple deep drops (eg. FZH 4 x 200m). Change batteries for the multi day surveys (RVRS). See change battery protocol for instructions.
16. Type **DS**. (spits out similar info).
17. On the left hand side, under the commands, find and select **General setup.**
18. Highlight **Initialize logging. (This will delete any data stored on the seabird – make sure everything has been uploaded – check CTD-incoming folder)**

19. Hit **execute** twice.
20. The CTD is ready for the next survey.
21. Disconnect CTD from computer and spray CTD male and female plug ends with “Underwater Connector Lubricant” and put back together.
22. Clean Transmissometer (see protocol) and wash water pump with DI water and syringe. Place the “Initialized and Cleaned” tag on the top of the CTD.

Uploading files to the online CTD portal

1. Open the xml. file from the last cast of the day using Google Chrome, you can use the mac for the following steps.
    a. File search for 'vMain'
    b. Record the vMain, vLith, iMain, iPump, iExt01 and iExt2345 values into the google drive file: "Hakai_CTD_battery_sensor_log.xlsx" .
2. **Submit CTD forms** from Garmin and iPAD. Make sure you enter any maintenance (changed batteries/o-rings etc).
3. Log in to the CTD Upload tool using your Hakai account.
4. Select work area – Calvert/Quadra.
5. On the left, select "**Upload**" under CTD tools.
6. Go to the folder where you saved the raw CTD files.
    i. Highlight all **hex files** that you downloaded from the CTD (eg. SBE19plus_01907467_2017_03_22_0001.hex)
        - Unlike the RBR, there will be one file for each cast with the final number of the filename being the cast number.
    ii. Drag and drop the hex files into the box on the upload page of the CTD portal.
    iii. Wait until all of the files have been uploaded – the files will show up with a ✓ in the "Uploaded raw files" box on the right side of the screen. This may take some time - if there is an error, see troubleshooting page.
7. Click **"Annotate"** on the left hand side of the screen.
8. Wait until all of the files have shown up in the "Select files to annotate box" – it may take a few minutes and you may need to press refresh.
9. Check the box in front of the file you would like to annotate.
10. A box called "Casts in selected files" will appear below matching the CTD hex file with the metadata from the submitted CTD form. It's best to select ~ 3 drops at a time to make it easier to catch miscasts and soaks.
    i. Using the oceanography field log from the day, make sure the match makes sense (i.e. instrument cast times and field times, drop number etc. should match with field log sheet). Check "Site dist." – should be < ~200m depending on currents/wind.
    ii. If the match does not make sense, click the box under the "form change" column (**# matches**) and select the best match from the list.
    iii. You can type in any comments that you missed in the iPAD under the comments column.
11. When everything looks correct, press **Save Annotations.** This will send the file to be annotated and processed. Move through the list and annotate each of the files. Once annotated, they will disappear from the list.

12. To ensure the files have been sent for annotation, you can select the **Download tab** on the left hand side of the page. Select the date for the files you just annotated. Under “Processing Stage” select **Annotated**. **Press search**. All of the files should appear below.

Troubleshooting

Connecting SBE to in Seaterm V2

If it does not connect (no writing in serial port box – bottom left hand side of the screen will say “Failed to open serial port” – see error log)

- Unplug the USB and put it back in – select the **communication tab** at the top of the screen – click **connect** – try this a few times. This usually fixes the problem.
- **Calvert** If this does not work – **communication tab** – **configure** – **select**:
    - Dell laptop – Port: COM6, Baud: 115200
    - Mac desktop – Port: COM3, Baud: 115200
    - Try connecting again
    - If you can’t get it to connect, try the other computer to see if it is USB port issue. If so, contact one of the tech crew on site. If you think it is an instrument issue, contact Jessy.
- **Quadra** If this does not work – **communication tab** – **configure** – **select**:
    - Dell laptop – Port: COM6, Baud: 115200
    - Mac desktop – Port: COM3, Baud: 115200
    - Try connecting again
    - If you can’t get it to connect, try the other computer to see if it is USB port issue. If so, contact one of the tech crew on site. If you think it is an instrument issue, contact Jessy.

Disconnected/Timeout in Seaterm V2

Periodically, the CTD will timeout and you will need to go to “Communications” and then select “Disconnect and reconnect”. If this occurs directly after the upload step, double check that your files were successfully saved into the CTD-Incoming folder.

Errors uploading Hex files to CTD Tool

Often, when you are uploading >5 files at a time, an error will come up and some of your files will have an X beside the file name. Press ok on the error and re-upload the required files. Try to upload hex files in batches of 5 or less. If you are uploading a lot of files, make sure you don’t miss any files.

Annotating files – instrument depth

For the SBE the “Instrument Depth” will not populate. This will only be filled in when using the RBR.

Annotating files – no metadata match

Make sure your iPAD files have been submitted and make sure that the dates are correct using the Submissions page and looking at the JSON file.

Annotating files – metadata not correct

If the CTD form was entered incorrectly you can recall the form using the Submissions page on the Portal, just as you would a Marine form. Once it has been recalled, fix all of the errors and resubmit. Refresh the CTD upload tool a bunch of times until the changes are updated so that you can then annotate the files correctly.

Annotating files – No KC1, or missing drop

Look at the file to determine whether there was a drop recorded. If there was, it might not show in the Upload Tool if a) the soak was deeper than the actual drop (i.e. soak 3m+, KC1 2m) or b) the CTD was dropped straight from the soak without coming to the surface. If no drop was recorded in Ruskin then the issue was in the field – was the CTD turned on (SBE)? Or not soaked for long/deep enough (RBR)?