NEW FEATURE – Petrel EXT (External PPO2 monitoring with Fischer connector)

The **Petrel EXT** is a trimix decompression computer that
displays PPO2 from 1 or 3 oxygen sensors.

Highly versatile, it can operate in the following modes:

Connected to rebreather:

- Closed-Circuit with external PPO2.
- Semi-Closed with external PPO2.
- Open-Circuit bailout.

Stand alone:

- Closed-Circuit with internal PPO2 set-point.
- Open-circuit.

Figure 1: Petrel EXT

NEW FEATURE – User Configurable Center Row Displays

The values displayed on the left and right side of the center row can now be configured by the user (see Figure 2). Not available when three external PPO2 values are being displayed.
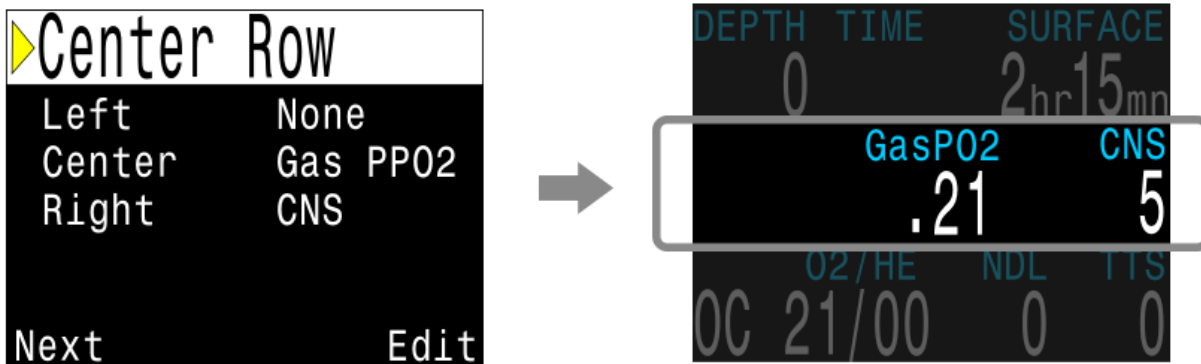

Figure 2: Center Row Setup Menu and Displayed Result

The following values are available:

Left and Right Positions	
Option	**Description**
None	Blank (default value).
Max Depth	The maximum depth of the current or previous dive.
Avg Depth	The average depth of the current or previous dive.
@+5	The TTS if remaining at current depth for 5 more minutes.

Ceil	The current decompression ceiling (not rounded to the stop interval).
GF99	The Buhlmann ZHL-16C super-saturation percent gradient.
CNS	Central Nervous System (CNS) toxicity clock as a percentage.
Clock	The time-of-day in 24hr or am/pm format (same as system setting). Does not show "am" or "pm".
DET	Dive End Time. The time-of-day when the dive will end (i.e. Clock plus TTS). In 24hr or am/pm format (same as system setting). Does not show "am" or "pm".
Dil PPO2	The diluent PPO2 at the current depth (Only available when CC is available).
FiO2	The fraction of inspired O2 as a percentage (Only available when CC is available).

The center position is less configurable, and depends upon the current operating mode.

Center Position (Open-Circuit only mode), Mode = **OC**	
Option	**Description**
None	Blank.
Gas PPO2	The PPO2 of the current OC breathing gas at the current depth (default value).
Center Position (Closed-Circuit Internal PPO2)**,** Mode = **OC/CC** PPO2 Mode = **Int.** (internal fixed PPO2)	
Option	**Description**
PPO2	The fixed PPO2 set-point of the closed-circuit breathing loop. When switched to OC bailout, displays blank. This position is not configurable when CC is available.
Center Position (Closed-Circuit External PPO2)**,** Mode = **OC/CC** PPO2 Mode = **Ext.** (external PPO2 measured from sensors)	
Option	**Description**
PPO2	The measured PPO2 of the closed-circuit breathing loop. When switched to OC bailout, continues to display the measured PPO2 of the loop. This position is not configurable when CC is available.
Note: When monitoring three (3) external PPO2 sensors, the center row is not user configurable. It will always display the three PPO2 readings.	

NEW FEATURE – Dive End Time (DET)

The Dive End Time (DET) is the time-of-day when the dive will end.

For example, if the time-of-day is 2:45pm and the TTS is 45 minutes, then the DET is 3:30pm (Figure 3).

The DET is only available in the new left or right configurable center row positions. The DET uses the same format (either 24 hour or am/pm) as the system setting. If in the am/pm format, then it does not show "am" or "pm".

Figure 3: Dive End Time is the time-of-day when the dive ends.
DET = CLOCK + TTS

The DET feature was added for CCR divers who are flexible with their bottom times, but have a fixed time-of-day to be back on the boat. Other uses are certainly possible as well. Of course, we recommend always properly planning dives in advance to ensure other limits, such as bailout gas, are not exceeded.

NEW FEATURE – Individual Dive Log Downloads

The dive logs can now be individually downloaded to your desktop or laptop computer.

This has a few advantages:

- Faster downloads (only new dives need to be downloaded).
- Entire Petrel log can be downloaded. The previous method would just download the last 20 hours of diving. The Petrel log is 1000 hours. So if for example your desktop computer crashed, you can now re-download your entire dive history on the Petrel.

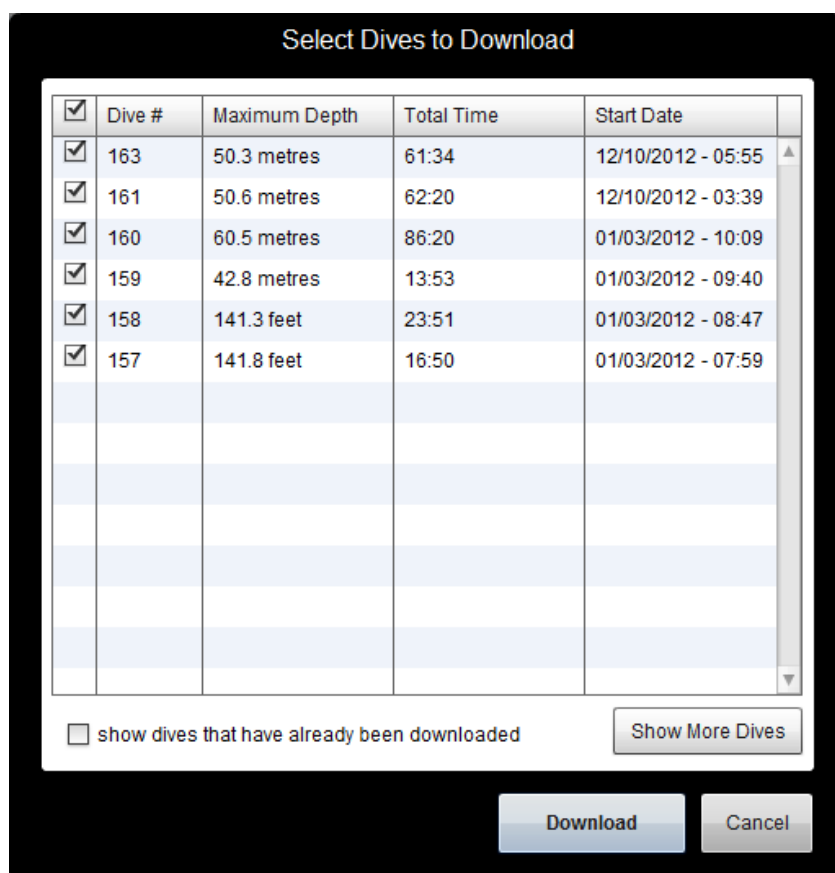The Shearwater Desktop user interface has changed slightly.

Figure 4: Choose the dives to download (by default all new dives are selected)

After connecting to Petrel by Bluetooth, a list of dives will be shown (see Figure 4), most recent dive first. Only new dives are shown, but all dives can optionally be shown. Choose the dives and press the "Download" button to begin.

Only 48 dives are initially listed, so press the "Show More Dives" buttons to see more dives.

APPENDIX A: Release Notes

Version 11:

- Public release. Recommended for all users of previous firmware versions.

- NEW FEATURE: Added support for Petrel EXT (external PPO2 monitoring with Fischer connector).

- NEW FEATURE: User configurable center row displays (Max depth, avg depth, CNS, DET, etc). Not available in all modes.

- NEW FEATURE: Dive End Time (DET) time. The time of day when the dive will end. For example, if the current time is 2:45pm and the current TTS is 45 minutes, then the DET is 3:30pm. Only available on the new configurable center row display positions.

- NEW FEATURE: Dive log downloading now allows individual logs to be selected for download. The entire dive log memory can now be downloaded (previous versions only downloaded the last 20 hours of diving).

- CHANGE: Adjusted low battery levels for 1.5V Photo Lithium battery type.

- CHANGE: Added compression to dive logs for faster downloading.

- BUG FIX: Fixed issue where the new values for max and avg depth of the previous dive were not saved to permanent memory when units (feet/meters) were changed.

- BUG FIX: Fixed issue where shallow repetitive VPM-B dives (less than 12m/40ft) were too conservative.

- BUG FIX: Improved accuracy of Buhlmann GF NDL times.

- NOTE: Versions V08, V09 and V10 were internal releases only

Version 07:

- Public release. Recommended for all users of previous firmware versions.

- CHANGE: Changed some VPM-B calculations to improve NDL time accuracy.

- CHANGE: Improved internal storage of settings.

Version 06:

- Internal release. Not a public release.

- CHANGE: Added a hard time limit of 15 minutes that the battery can be removed until the deco tissues are reset. Previously tissues would be retained as long as super-capacitor able to keep the clocking running. However, 15 minutes is ample time for battery change, and a hard 15 minute time limit adds consistency.

Version 05:

- Internal release. Not a public release.

- NEW FEATURE: Added new style of Gas Select and Define Gas menus. The old style (classic) still available. Switch between styles in Adv Config 1 menu.

- CHANGE: Color of turned-off gases is now magenta (purple). The dark gray was more intuitive, but unfortunately was too hard to read in some lighting conditions.

- CHANGE: Default Title Color changed from blue to cyan. Note that title color can still be customized in the Adv Config 1 menu.

- NEW FEATURE: Battery info screen added to Advanced Config. Includes battery type, current battery voltage, time on since last change, and date of last change.

- BUG FIX: Changed so a gas that is set to 00/00 cannot be selected as the active gas. The only way for this bug to occur was to have a zeroed gas turned on, and then turn the active gas off in the System Setup menu. Also, zeroed gases can no longer be turned on.

- BUG FIX: Fixed bug entering time when AM.

Version 04:

- Public release.

- CHANGE: Button label font color now white.

- CHANGE: Changed Bluetooth Class of Device from 0 to 0x80704 (Wearable Wrist Watch with Capturing Service). This change to allow Bluetooth connections to older Android phones that have a bug in their Bluetooth stack.

- CHANGE: Internal change to how serial number is generated. No external effect.

Version 03:

- First public release to customers.

- BUGFIX: Fixed problem where Missed Deco Stop error would be generated if last deco stop cleared while diver slightly shallower than last stop.

Version 02:

- CHANGE: Added additional checking on stored settings.

Version 01:

- First release to production.