

## Xpert and Xpert Dark Internal Battery Replacement

**Procedure Number: SOP # 6.3.2.1.6**

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1. **Title** Xpert and Xpert Dark Internal Battery Replacement



2. **Purpose**

To detail the procedure on how to effectively replace the CR2032 coin cell battery from the Xpert (8080-0000-2A) and Xpert Dark (8080-0001-2A) data logger's internal circuit board.

3. **Background/History**

The Sutron® Xpert Data Loggers were first introduced within the CO-OPS National Water Level Observation Network (NWLO) in April of 2004. For primary data collection platforms that collect and broadcast oceanographic/water level and meteorological data in satellite messages, system time (Greenwich Mean Time) is maintained by a Trimble Bullet III GPS antenna. Updated prior to every GOES transmission, this is to ensure that the measuring algorithms for all datasets are as accurate as possible.

In the event of GPS antenna destruction or GOES transmitter failure, time is solely kept by an internal real-time clock within the Xpert. For complete malfunction of the primary data collection platform, the time of the redundant system (DCP #2) is also dependent on a CR2032 battery. The life span of these batteries varies greatly, and should be replaced at least every three years or sooner if the Xpert system indicates a low battery voltage.

4. **Scope/Applicability**

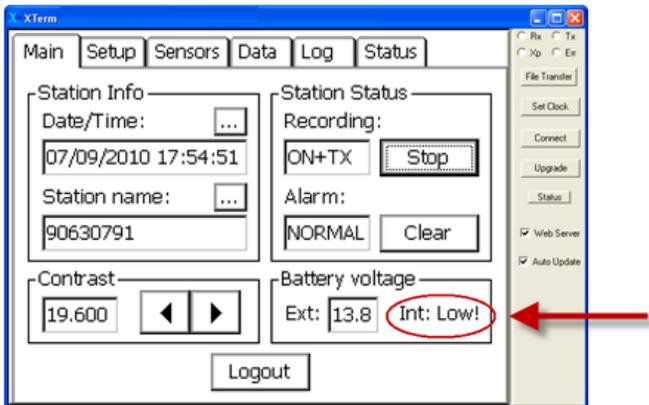
Engineering Division/Chesapeake Instrument Lab  
 Field Operations Division/Seattle Instrument Lab  
 Field Operations Division/Atlantic Regional Office  
 Field Operations Division/Pacific Regional Office

5. **Main Processes**

Exchanging a CR2032 battery will occur in most instances in the field (at the station, on site). It is foreseeable that in some cases, this practice will occur prior to field deployment (e.g., in the lab during throughput testing). Before replacement, the following materials will be required:

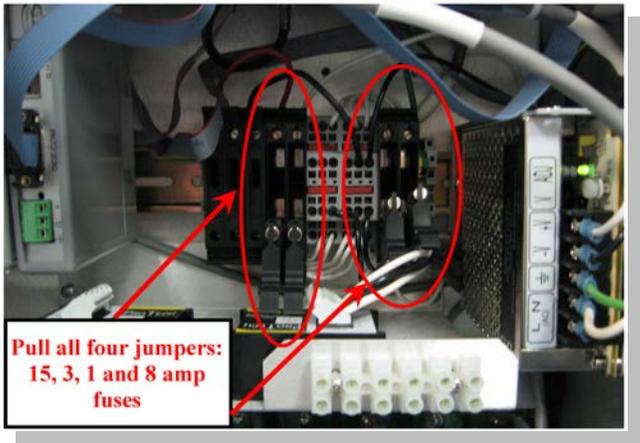
- i. CR2032 3V Lithium coin cell battery, tested and ready for issue
- ii. Small Phillips screwdriver
- iii. An insulated, non-conductive tool (e.g., composed of Delrin)

**6. Detailed Sub-Processes/Checklists**



a) By either logging in with Xterm (settings at default, Com 1: 115200 bps) or using the graphical user interface (GUI) screen, select “Retrieval Access.” At the Main tab, the interior battery voltage will be reported on the bottom right of the screen. If the Xpert states “Low!”, then the CR2032 battery will need to be replaced.

b) Transfer all DCP setup files to the user’s computer. Completely turn off the remote telemetry unit (RTU). Pull down all employed fuse holders (marked 15, 3, 1 and 8 amp) to disable complete power.



c) Unplug all ribbon cables and power wiring from the Xpert/Xpert Dark data logger.



- d) Within the RTU enclosure, disconnect all four 6-32 x  $\frac{3}{8}$ " pan head screws with an appropriate Phillips screwdriver located behind the Xpert panel door. Remove the data logger.



- e) With the Xpert completely removed from the RTU enclosure, place the unit on a clean surface. Remove all eight 4-40 x  $\frac{3}{16}$ " flat head machine screws (two on each side) with a small Phillips screwdriver. As the screws are small in size, be sure to place them in a secure location!

- f) Locate the battery on the top surface of the Xpert printed circuit board. An insulated, non-conductive tool will be required in order to avert any potential damage to the inner circuitry. The contacts of the surface mount coin cell holder are composed of metal material, with the polarity clearly marked and the model number facing upward.



Non-conducting tool



- g) With the tool, vertically pry open the retaining clip of the surface mount coin cell holder. With the other hand, slide the old battery out.

- h) Verify the condition of the new battery with a volt-meter; nominal voltage should be around 3V. If the condition is acceptable, slide the new battery in the holder. Reseal the Xpert and replace within its enclosure. Turn the complete system on by returning all fuse-holders to their place. For documentation purposes, mark the battery install date on the NWLON station's E-Site report.

## 7. **Quality Assurance/Control**

When the RTU powers up, verify the system time and the voltage status of the internal battery on the main tab. If the time has proven to be correct and the internal voltage to be acceptable, reboot the Xpert once more and remove the GPS antenna cable on the right side of the RTU enclosure. Xpert OS protocol has the data logger to set its time based on GPS timing signal; however, the absence of the GPS antenna will cause the data logger to rely on the internal clock only. If the current time is still noted, then the battery replacement was completed properly.

If the system time has a date of 01/01/2000 and the internal battery voltage reporting "Low!", then the transition to the new battery was not successful. If the replacement of another new battery is found to have the same results, then the transfer of a new Xpert data logger from the field spares parts kit will be necessary.

## 8. **Management/Responsibility**

All CO-OPS personal and IDIQ field contractors are accountable for checking clock voltage status when performing every site visit. In the event of any component failure, all flawed materials will be promptly returned to either the Chesapeake Instrument Lab (CIL) or the Seattle Instrument Lab (SIL).

### Acronyms

RTU – Remote Telemetry Unit  
DCP- Data Collection Platform  
CIL – Chesapeake Instrument Lab  
SIL – Seattle Instrument Lab