

GOES-Enabled Portable Tide Gauge Setup, Configuration, and Data Export Procedures

Procedure Number: SOP # 5.4.1.1.C1

Created: May 2011

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- 1) **Title:** GOES-Enabled Portable Tide Gauge Setup, Configuration, and Data Export Procedures
- 2) **Purpose:** To provide a basic overview of the Portable Tide Gauge (PTG) system and familiarize the user with the gauge's physical setup, 9210B data collection platform (DCP) configuration, data export, and the procedures for setting up communications via GOES transmissions.
- 3) **Background/History:** The Portable Tide Gauge is the next generation of water level measurement system for use by hydrographic field parties and other users for temporary installations in locations without the infrastructure to support a typical full installation. The PTG is a stand-alone water level station housed in a ruggedized weatherproof housing and includes all components necessary to measure, record, and transmit near real-time water levels from anywhere within the GOES footprint. The PTG uses a pump instead of compressed nitrogen for its bubbler system, which reduces the overall weight and complexity of the system.
- 4) **Scope/Applicability:** This SOP applies to Office of Coast Survey (OCS) Hydrographic Field Units, contractor personnel, and Field Operations Division (FOD). OCS and contractor personnel will utilize the following procedures for preparing and operating PTGs in remote areas, primarily in Alaska.
- 5) **Main Processes:** Setup and connect ancillary components, power system on, configure station specific information, and download data.

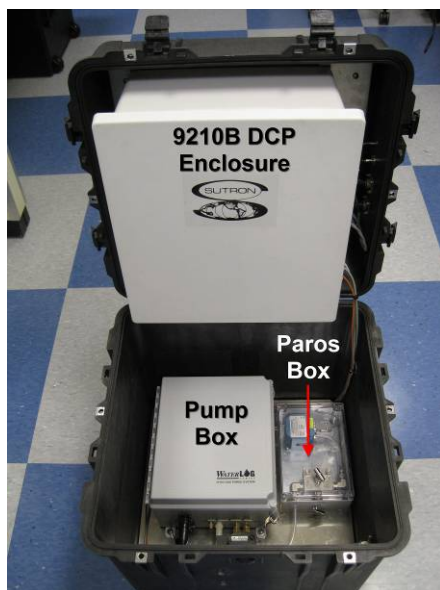
Software Installation: Communications with the PTG require use of Xterm.exe. This is a small executable file which does not require administrator privileges to run. This software was provided by CO-OPS and should be available on the ship's server.

Hardware Required: Complete PTG kit which includes the gauge itself, GOES and GPS antennae, 40W solar panel, 40Ah battery, tripod, orifice, bubbler tubing and necessary cables. Additionally, a computer with an available serial port and a DB-9 serial cable are required to configure the DCP and/or manually download data.

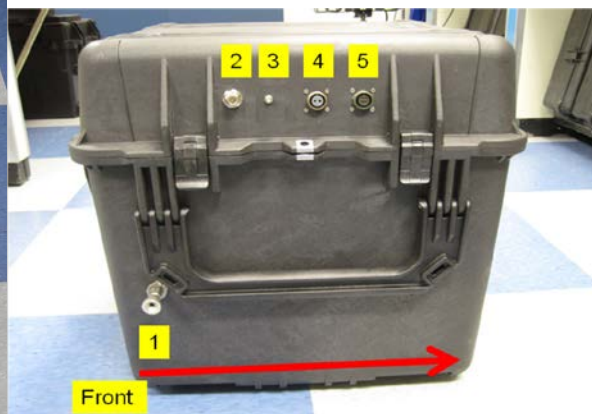
- 6) **Detailed Sub-Processes/Checklists:** Use the following step-by-step procedures to setup and configure the Portable Tide Gauge.

I. Portable Tide Gauge Component Familiarization:

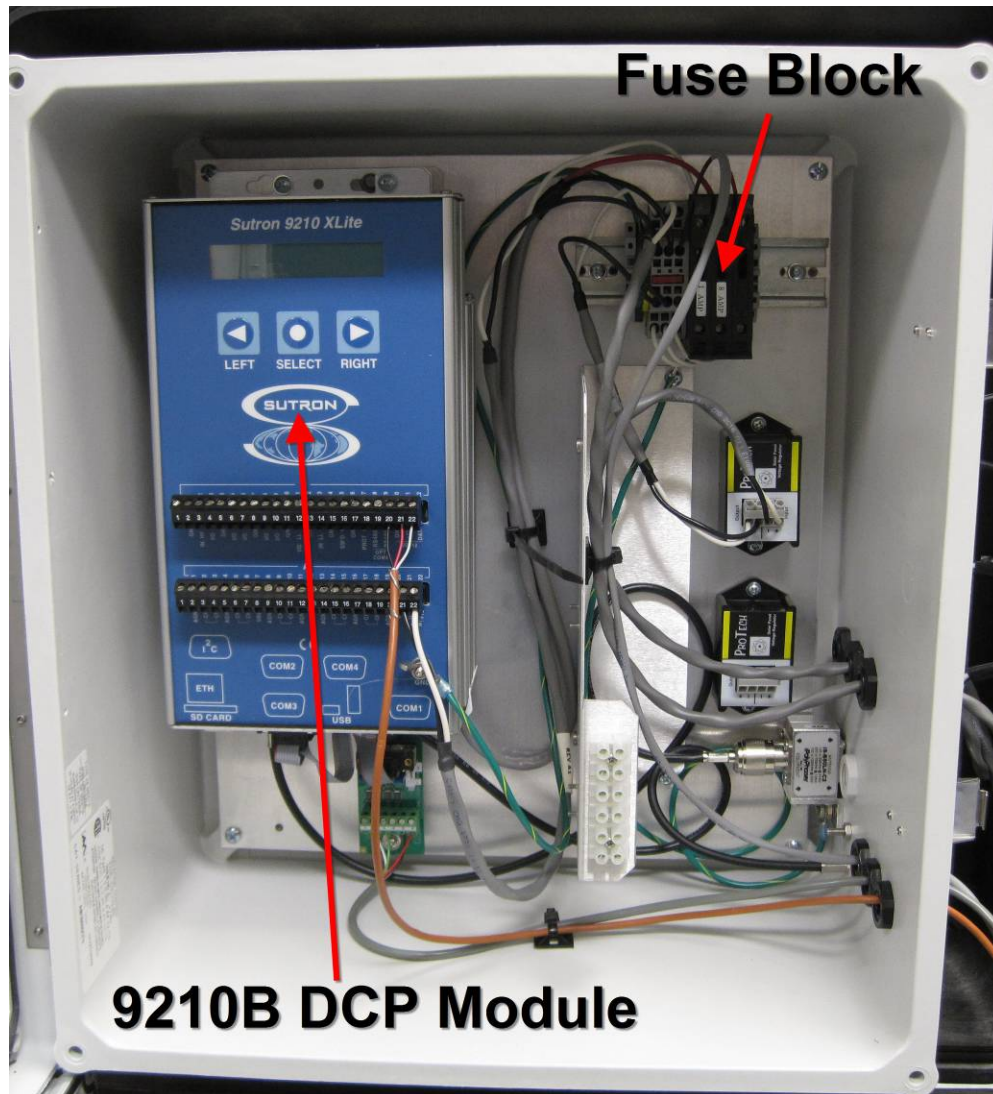
- 1) The Portable Tide Gauge components are housed within a ruggedized, weatherproof housing. Inside the housing are mounted a Sutron 9210B Data Collection Platform (DCP), a WaterLog H-355 Pump, and a Paroscientific 6000-30G pressure sensor. There are five external connections on the outside of the housing for connecting peripheral components.



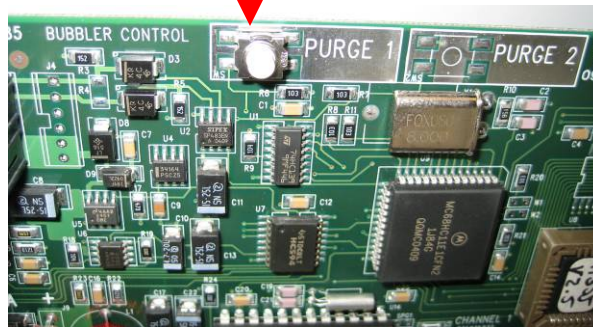
- 1) Orifice quick connect
- 2) GOES antenna connection (Type-N)
- 3) GPS antenna connection (SMA)
- 4) Solar panel connection (2 pins)
- 5) Battery connection (4 pins)



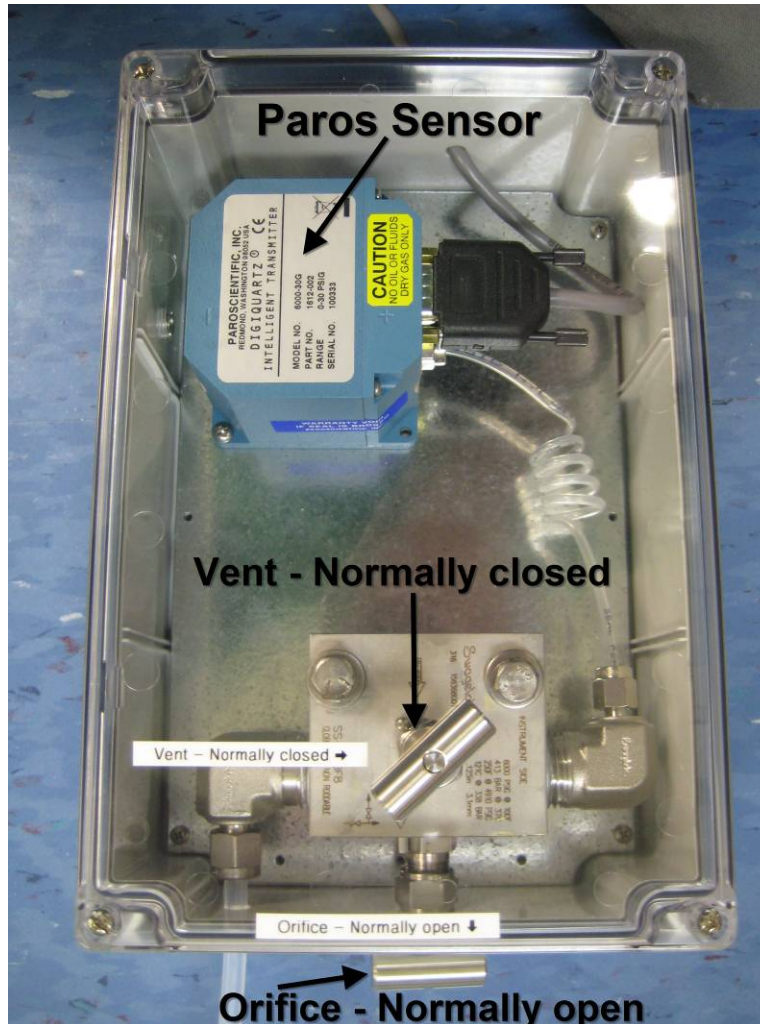
- The DCP enclosure houses a Sutron 9210B DCP module; the data recorder and communications device. Mounted directly behind the 9210B is a Sutron Satlink2 satellite transmitter. The fuse block is also located inside the DCP enclosure; there are three fuses 1A for the DCP, 5A for the Pump, and 8A for the Satlink. Push these fuses into the engaged position to power the system up; disengage to power off.



- 3) The Pump includes a compressor, a compressed air cylinder, and various electronic components. On the left side of the enclosure is a circuit board with a purge button. To purge the system, hold the white button down for several seconds and then release it; there should be bubbles. You may need to repeat the purge several times for long tubing runs.



- 4) The Paros box includes the sensor itself as well as a manifold which allows the sensor to be isolated or vented to the atmosphere as opposed to the orifice. Normal operations will be conducted with the valve on the top of the Paros box firmly closed and the valve on the front of the Paros box fully open (open until you meet resistance and then close ½ turn).



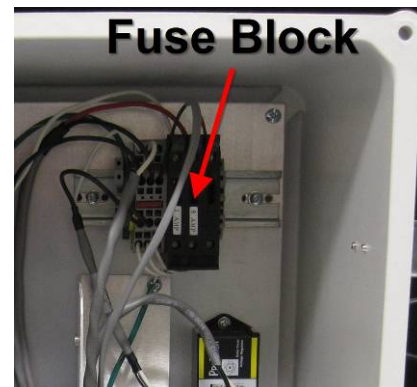
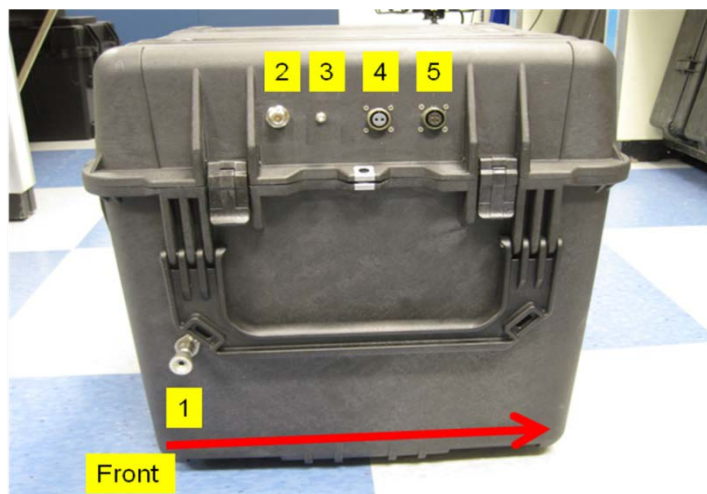
***NOTE:** To ensure proper opening/closing of the Portable Tide Gauge case, make sure the stays on either side of the housing are in sync with each other before closing. If you get resistance when attempting to close the case, first lift the lid and then lower it. Please do not force the lid closed as it may damage the hinge.

II. Physically Setting Up the Portable Tide Gauge:

- 1) Connect the five ancillary components, moving front to back:
 - a. Orifice – Ensure compression fittings are firmly seated, the bubbler tubing is not kinked, and the orifice is mounted to a stable structure.
 - b. GOES Antenna – Mount with a clear line of site to the sky using the azimuth and elevation provided in the Project Instructions.
 - c. GPS Antenna – Mount with a clear view of the sky directly overhead.
 - d. Solar Panel – Mount facing south with good solar exposure (2 pin connector).
 - e. Battery – Place upright on stable ground (4 pin connector). Also, please provide a top off charge to the battery prior to operational installation to lengthen the overall battery life.

- 2) If you are configuring the DCP prior to the actual installation it is only necessary to connect the battery and the orifice pigtail. The battery is needed to power the system up and the orifice pigtail is needed to ensure that the system doesn't overpressurize and damage the Paros sensor. Additionally, please install a 7W or greater dummy load to the GOES antenna connection to prevent damage to the Satlink.

***Note: Ensure that the fuse block latches are disengaged before connecting the battery and solar panel. Engage them after there is power available to prevent possibly blowing one or more fuses.**

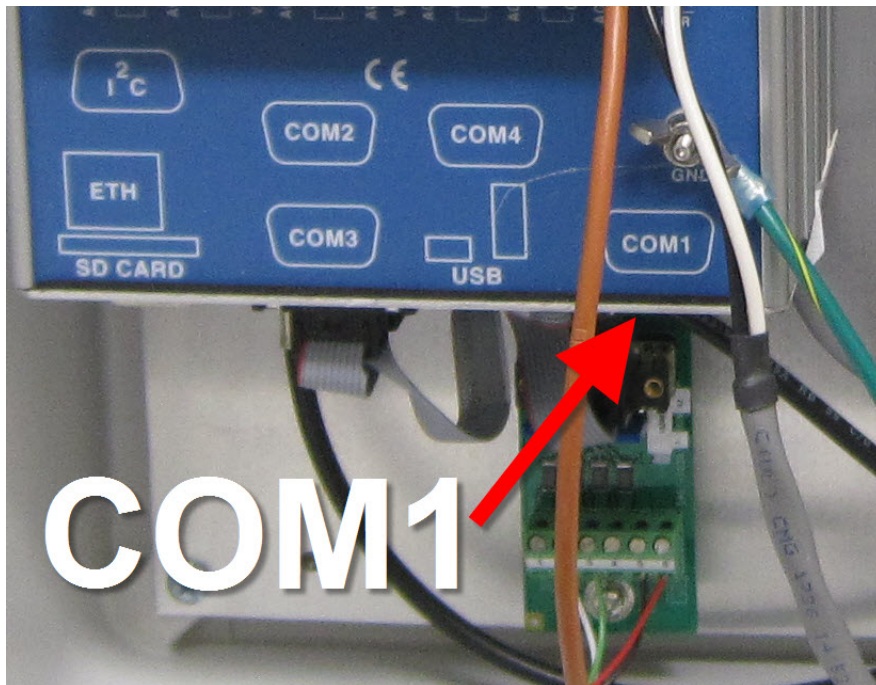


- 3) After the needed connections have been made, engage the three fuses located inside the DCP, thus powering up the system. The DCP typically takes 5-10 minutes to fully load and allow communications and control.

- 4) If the Station ID was already setup the station is now up and running. If not, please use the procedure below to configure the Station ID.

III. Configuring the Station Specific Information in the DCP

- 1) Once the system has powered up, locate the Sutron 9210B DCP within the DCP enclosure and connect your computer to COM1 on the 9210B using a DB-9 serial cable. COM1 is located on the bottom surface of the bottom right corner of the DCP.



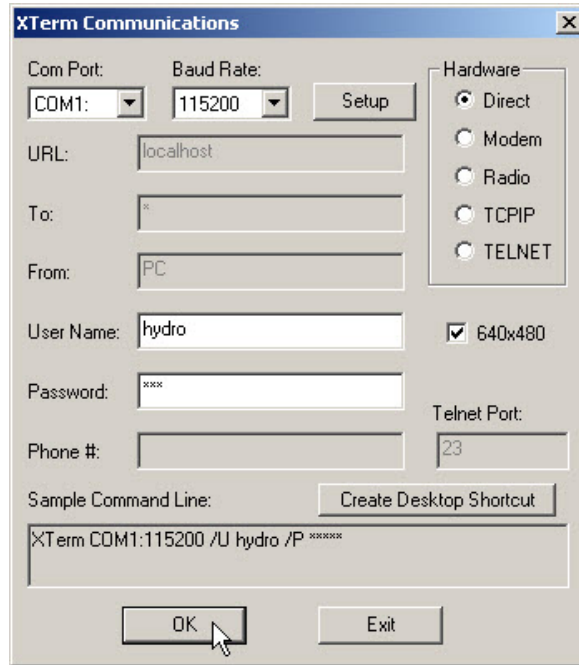
- 2) Open the Xterm.exe application on your computer.



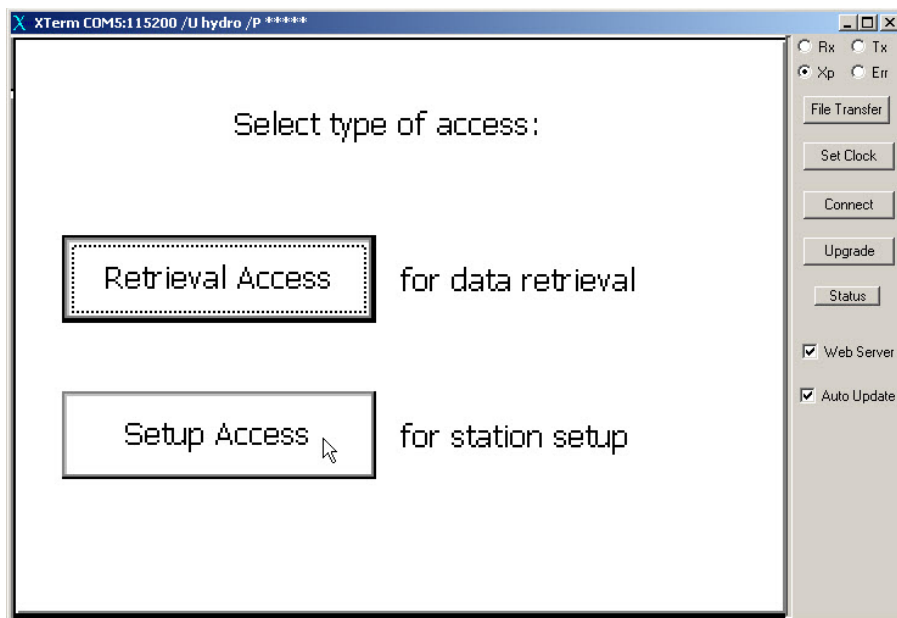
This is a small executable file that does not require admin privileges to run and should be on the ship's server. Alternately, this software can be downloaded from:

<http://www.sutron.com/downloads/software.htm>

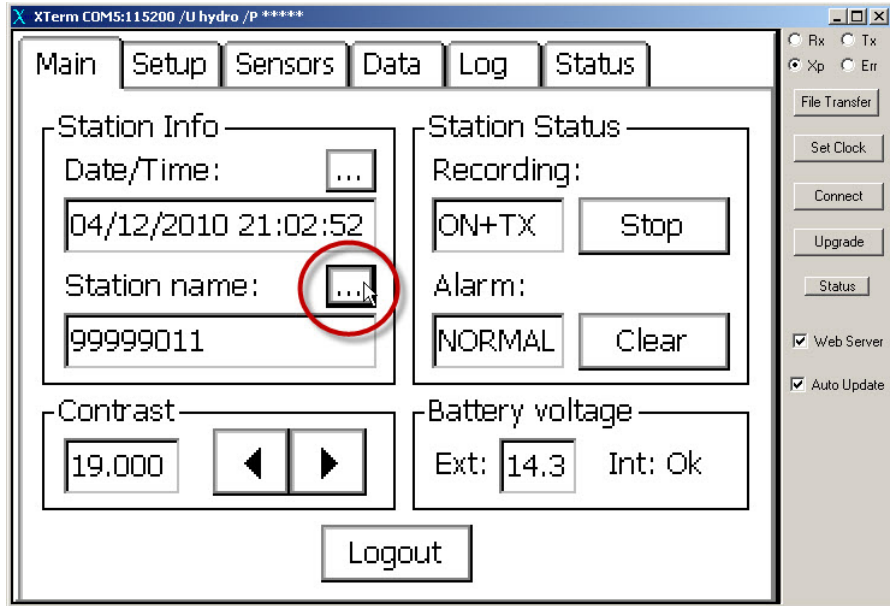
- Verify that the COM port selected corresponds to the COM port being used on your computer (typically COM1 for a laptop), that the Baud Rate is set to 115200, and that Hardware is set to Direct as shown in the below graphic. Enter a User Name of **hydro** and a Password of **ptg** and click **OK**.



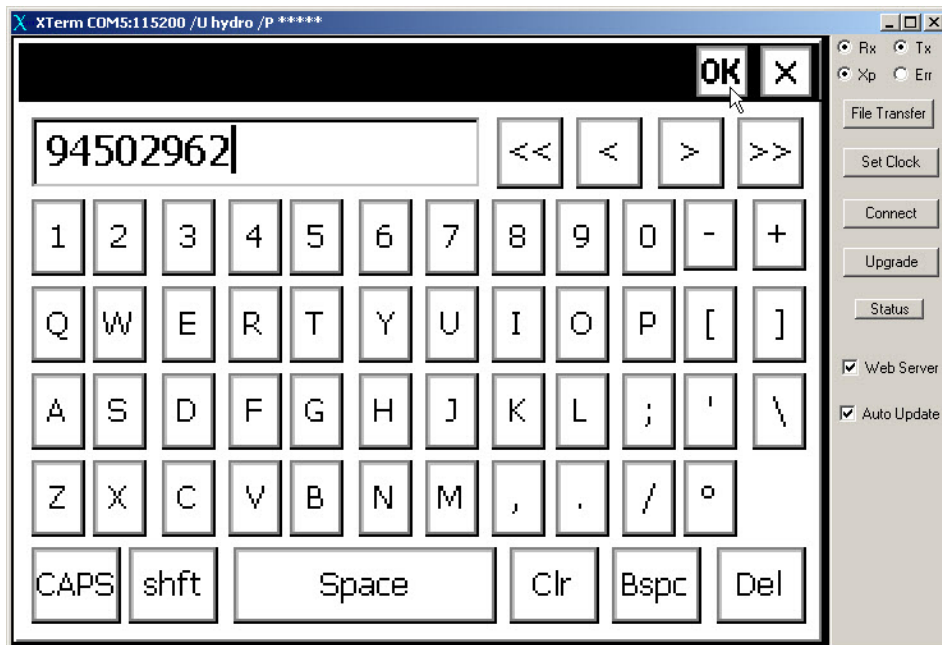
- This will bring up the GUI interface with the DCP as shown below. Click the **Setup Access** button to proceed with setup.



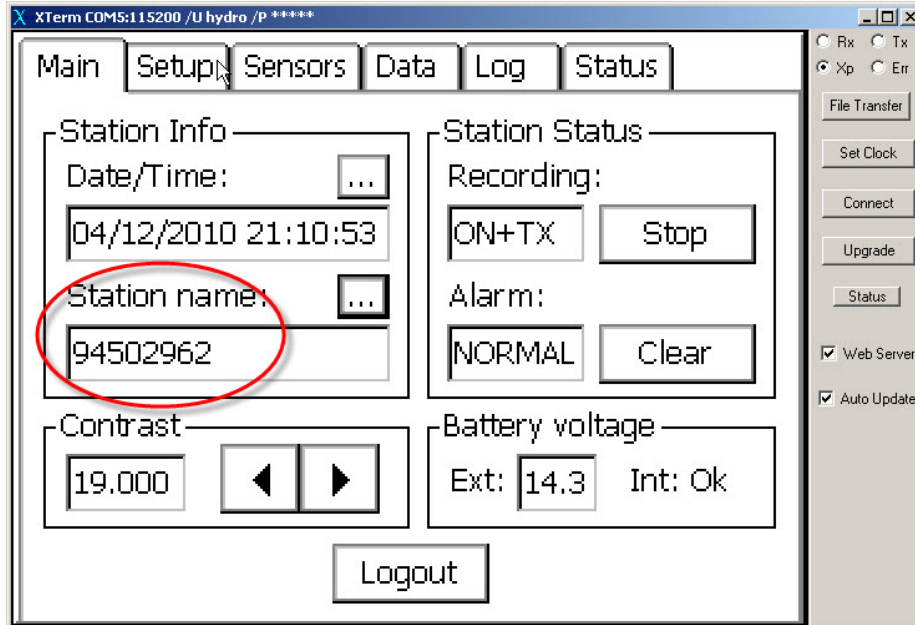
- Verify that the Station Status Recording is set to ON+TX and then update the Station Name to be that of the upcoming or current installation by clicking on the ... symbol adjacent to Station name



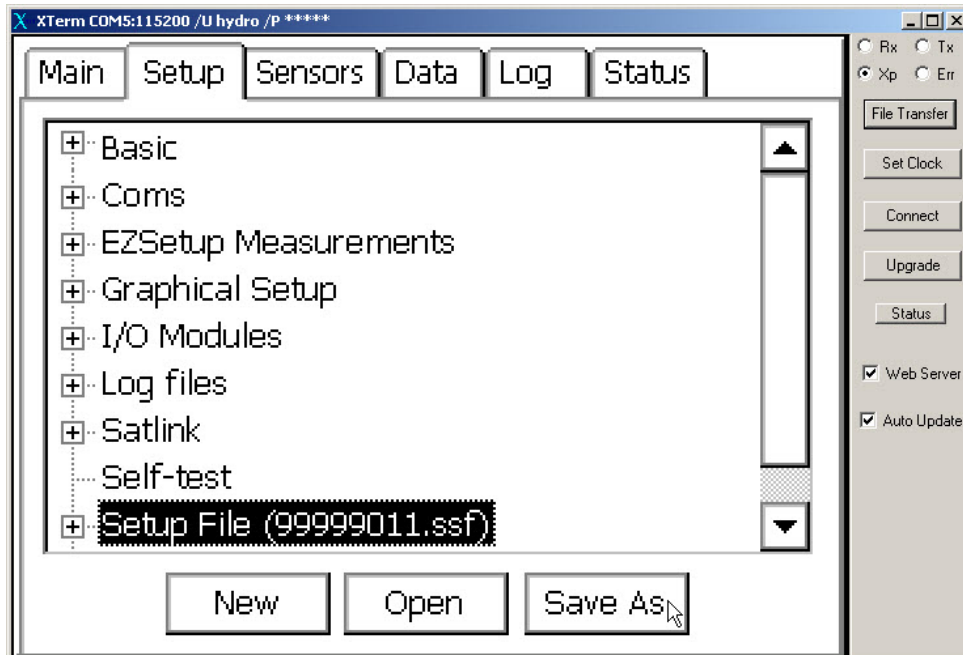
- Enter the correct eight digit Station ID into the field using either the numbers on the top of your keyboard or by clicking on the numbers on the screen (your computer's number pad will not work in this field) and click on **OK**.



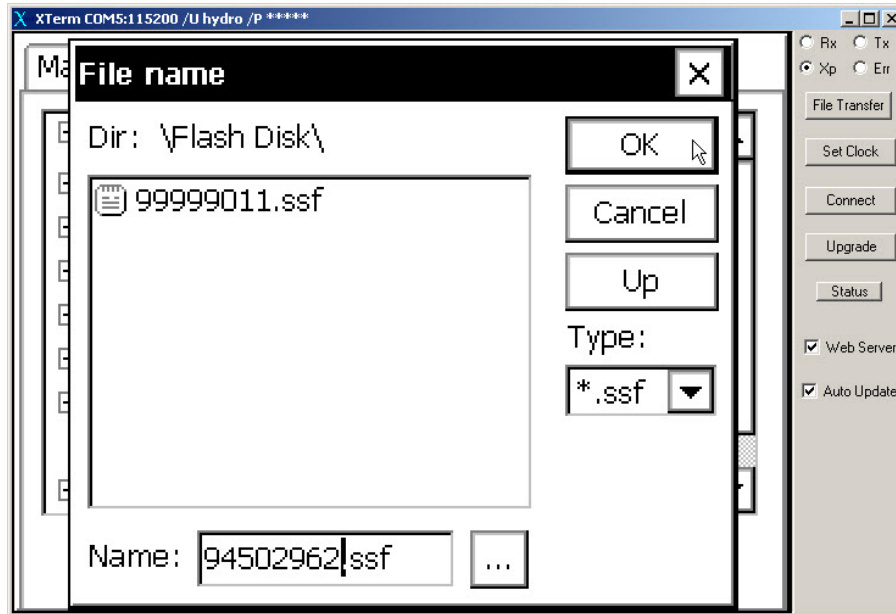
- 7) Verify that the Station Name is correct and then click on the Setup Tab at the top of the XTerm window



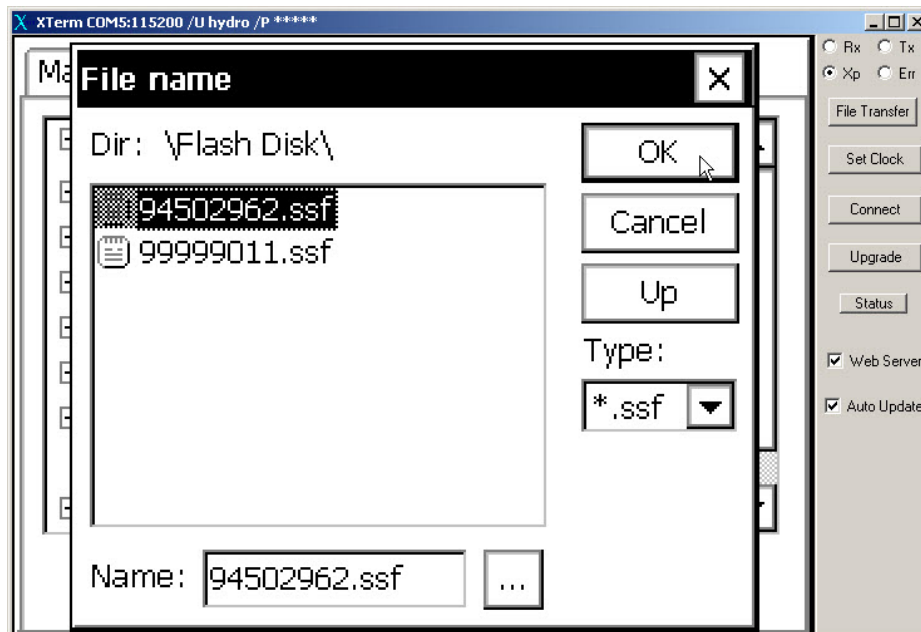
- 8) Next, save the setup file named with the Station ID. This will ensure that if the station is rebooted or power cycles it will automatically load the setup file upon boot. To do this, click on the words **Setup File** to highlight it and then click the **Save As** button.



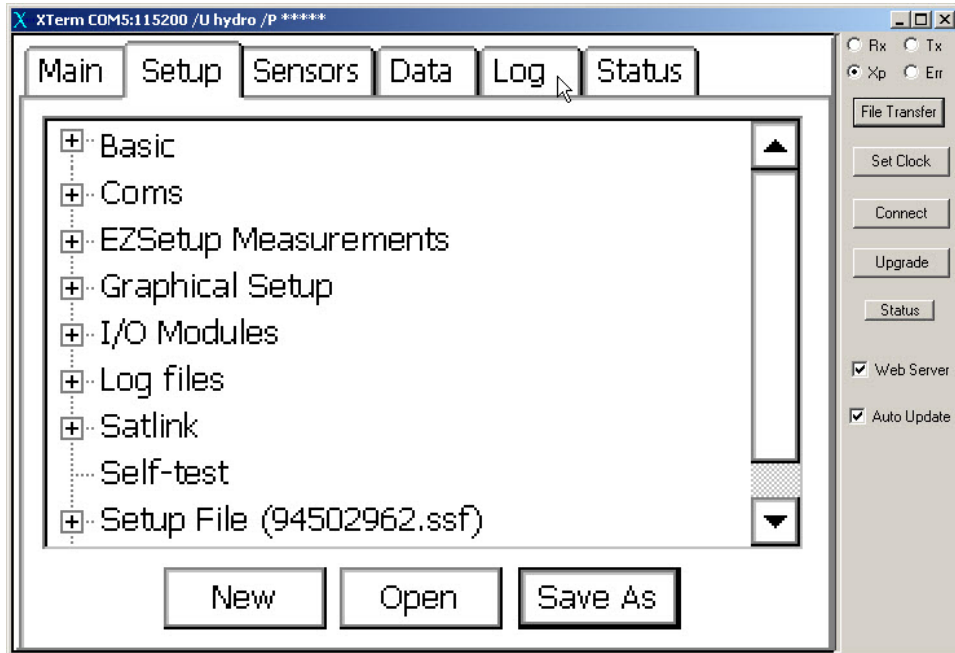
- 9) Now, in the Name field at the bottom of the window use your cursor to highlight the eight numerical digits of the name file and overwrite them with the new Station ID using the numbers at the top of your keyboard. Ensure that the station number is followed by .ssf and click **OK**.



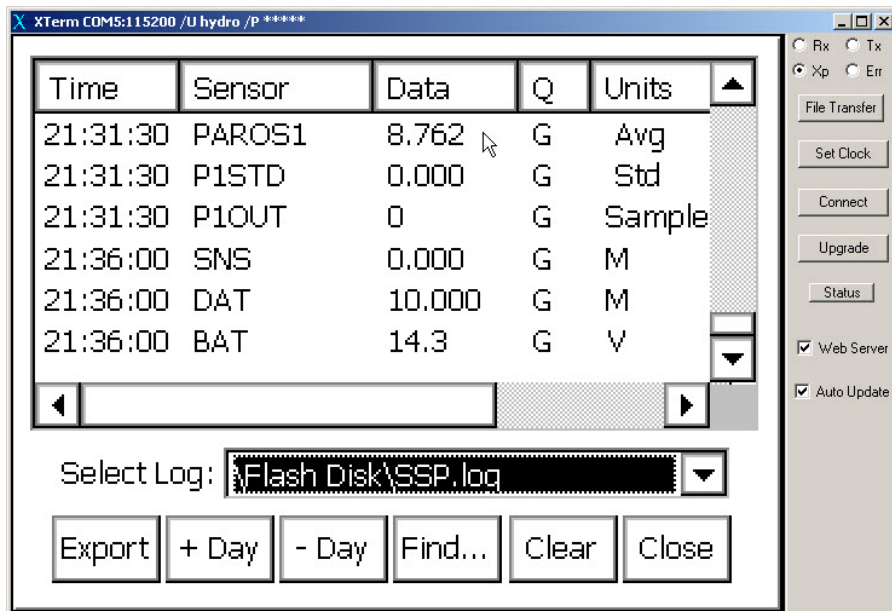
- 10) This will take you back to the Setup tab. Now, to create a backup of the setup file highlight **Setup File** and click the **Save As** button again. This time simply highlight the file with the correct name and click the **OK** button again.



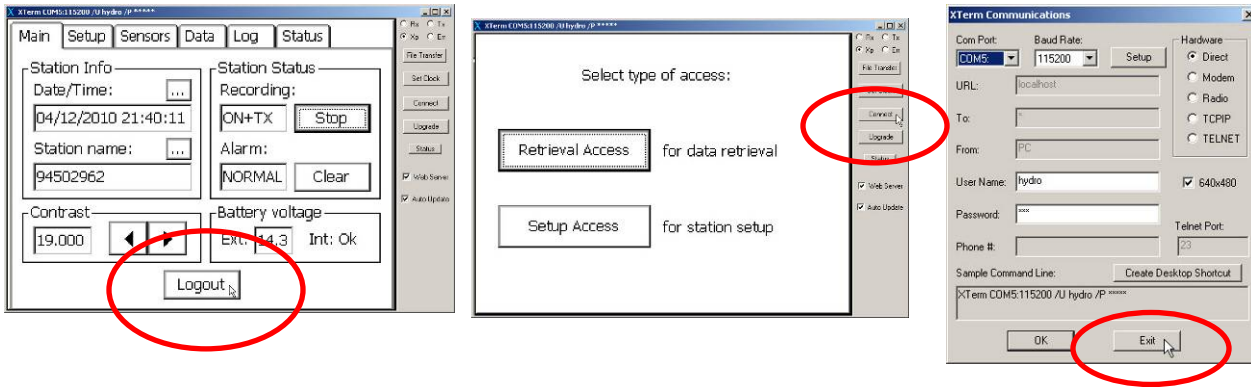
11) This will return you to the Setup tab again. Now, to verify that data are being logged click on the Log tab at the top of the screen.



12) The system should automatically bring up the SSP.log. If not, click the small down arrow next to the Select Log field to access the dropdown and select SSP.log from the list. This will bring up the water level data that the system is recording. Verify that the Paros1 values are updating. All times are UTC.



13) This completes the configuration of the DCP. To log out of the system click on the close button on the bottom of the Log screen. This will return you to the Main tab. Simply click the Logout button at the bottom of the screen then click the Connect button from the login screen. Close Xterm by clicking the Exit button.

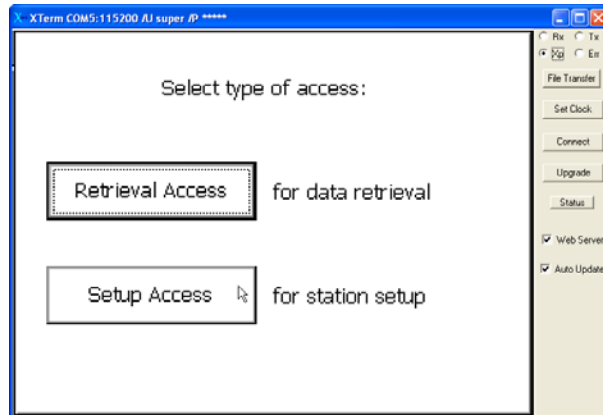
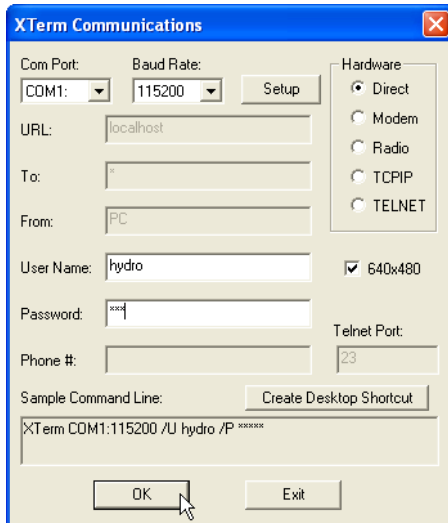


14) If you were configuring the system in advance of deployment you should now disengage the fuses to power the system down and detach any ancillary components prior to transport. This concludes the Station Specific Configuration procedure.

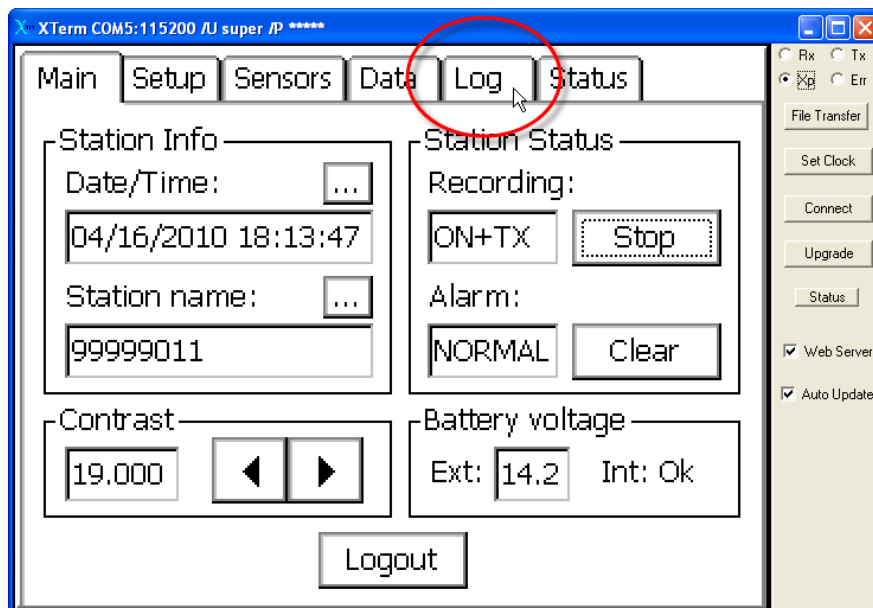
15) To ensure proper closing of the Portable Tide Gauge case, make sure the stays on either side of the housing are in sync with each other before closing. If you get resistance when attempting to close the case, first lift the lid and then lower it. Please do not force it as this may damage the enclosure hinge.

IV. Exporting Data from the Portable Tide Gauge using XTerm

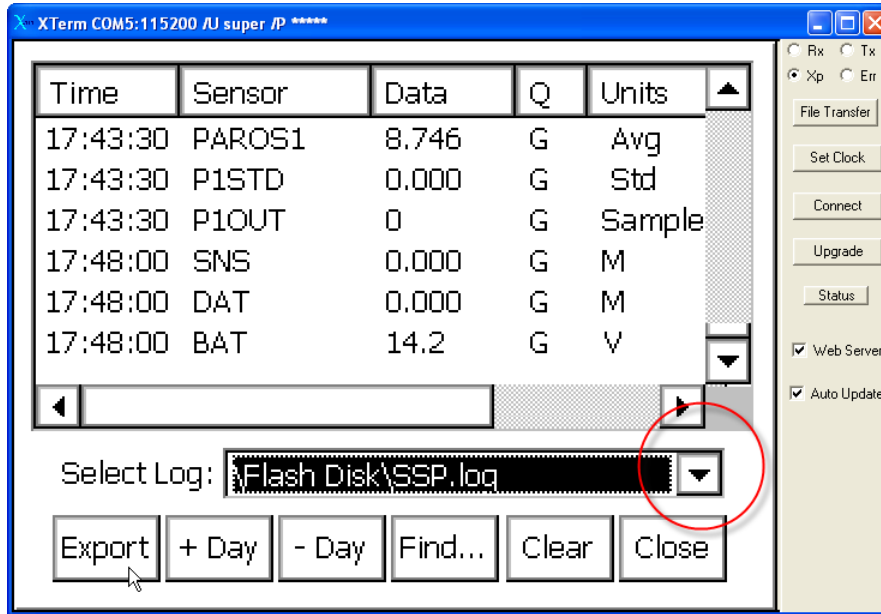
- 1) Connect to the DCP as in step III using Xterm, the appropriate COM port and user name/password combination. As in Step III, choose Setup Access at the “type of access” prompt.



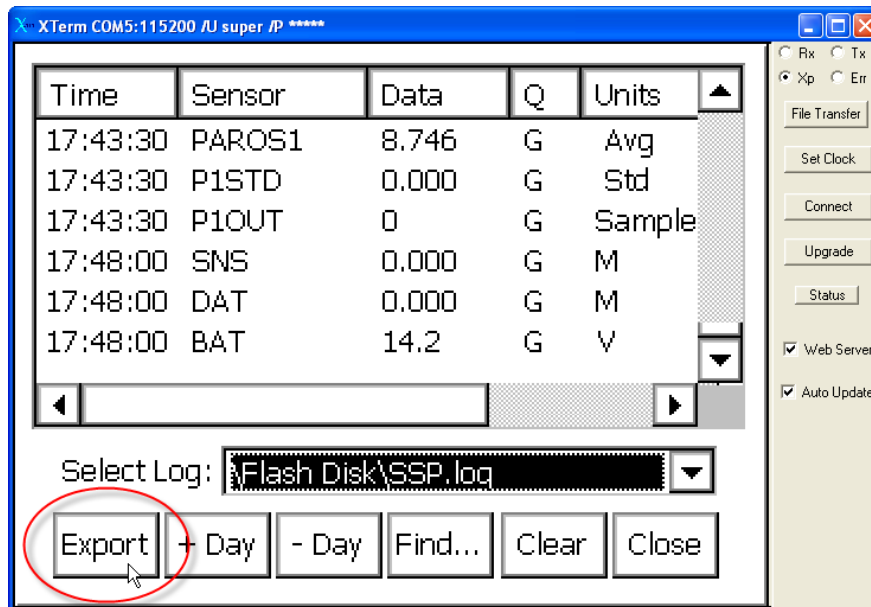
- 2) Once you are logged on, click on the Log tab at the upper right edge of the screen.



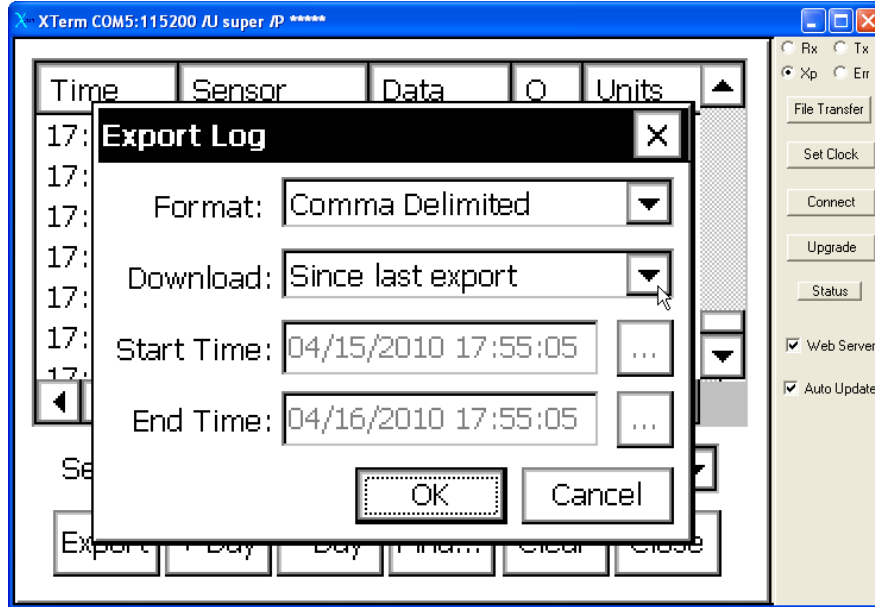
3) Select \Flash Disk\SSP.log from the Select Log dropdown (usually the default)



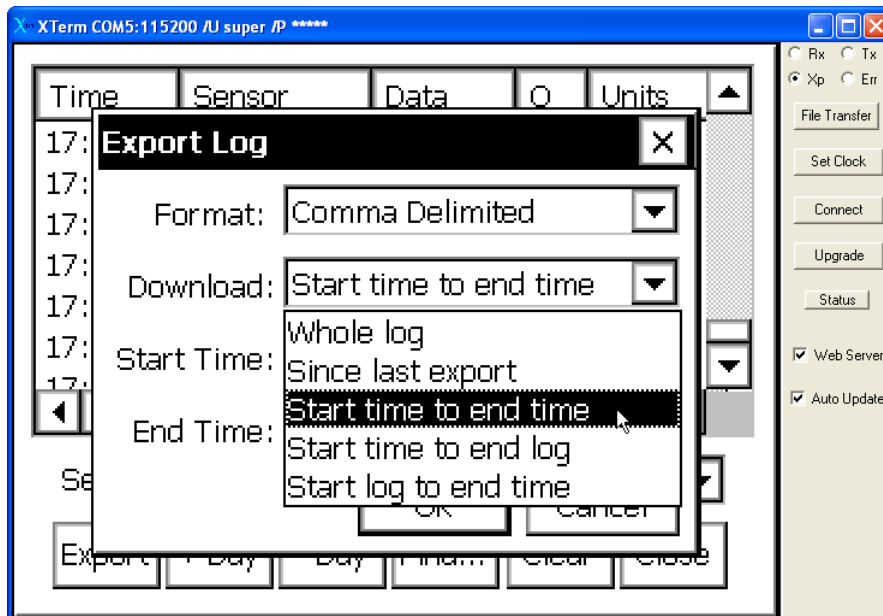
4) Click the Export button at the bottom left



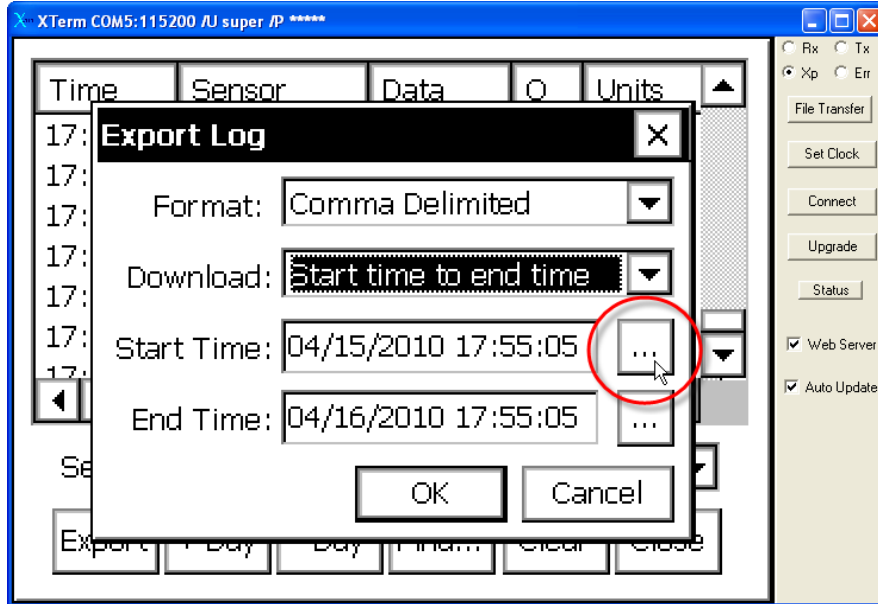
- 5) In the Export Log window you will be able to choose the dates and times of the data you want to export. Keep the default format “Comma Delimited”.



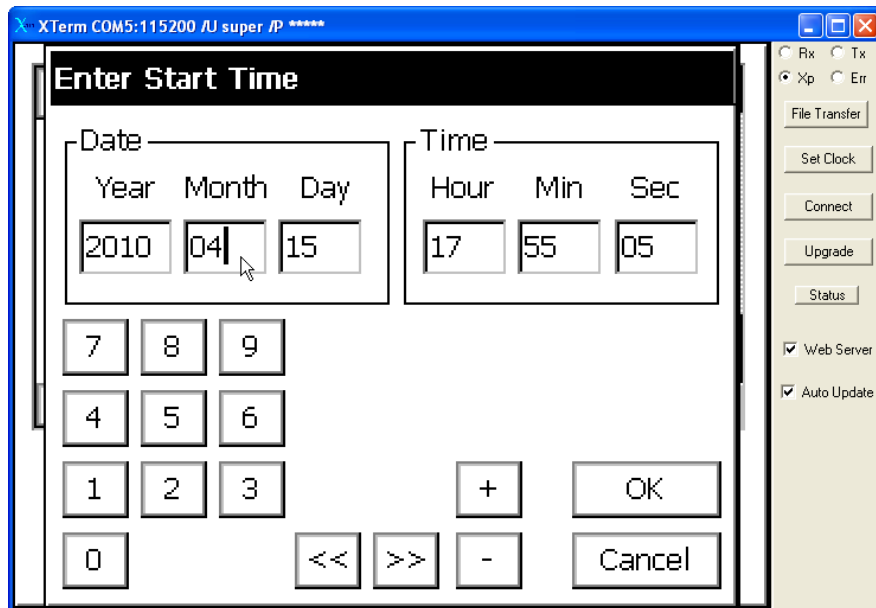
- 6) From the drop down menu next to Download, select “Start time to end time.”



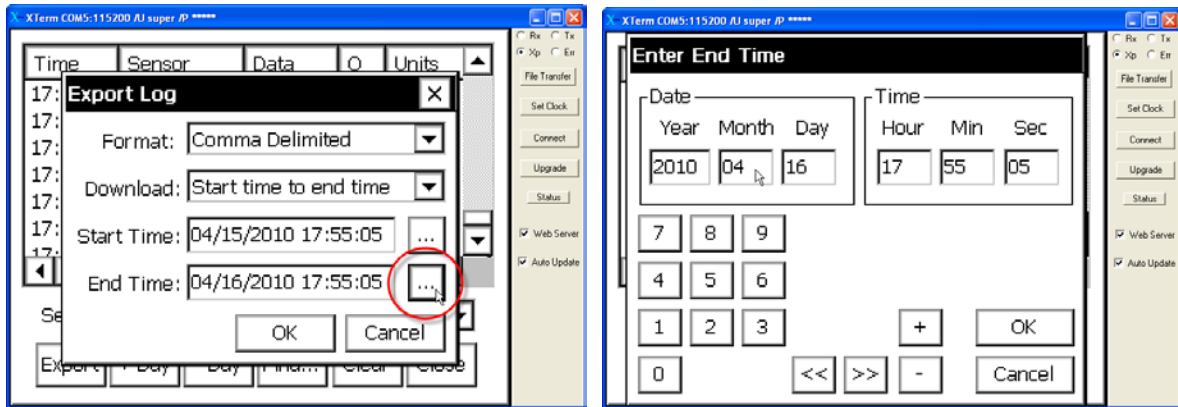
- Click on the three dots (...) next to the Start Time field specify the section of the data you want to download.



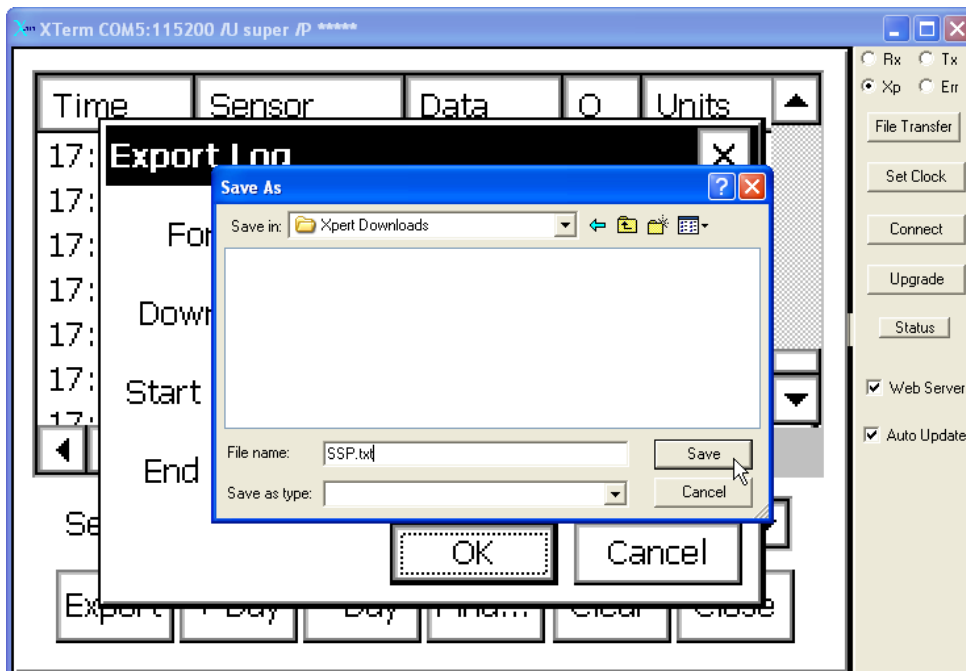
- Enter the Date and Time (UTC) that you would like to start the data from and Click OK.



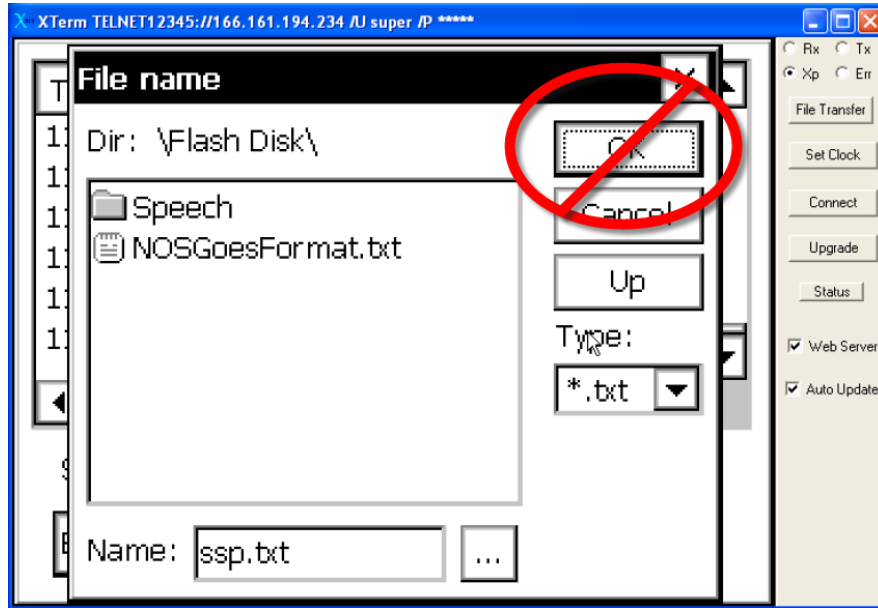
- 9) Click on the three dots (...) next to the End Time field and enter the ending time for the log section. This is only necessary if you want the data to end at an earlier time than now; if you want data until now skip step 9.



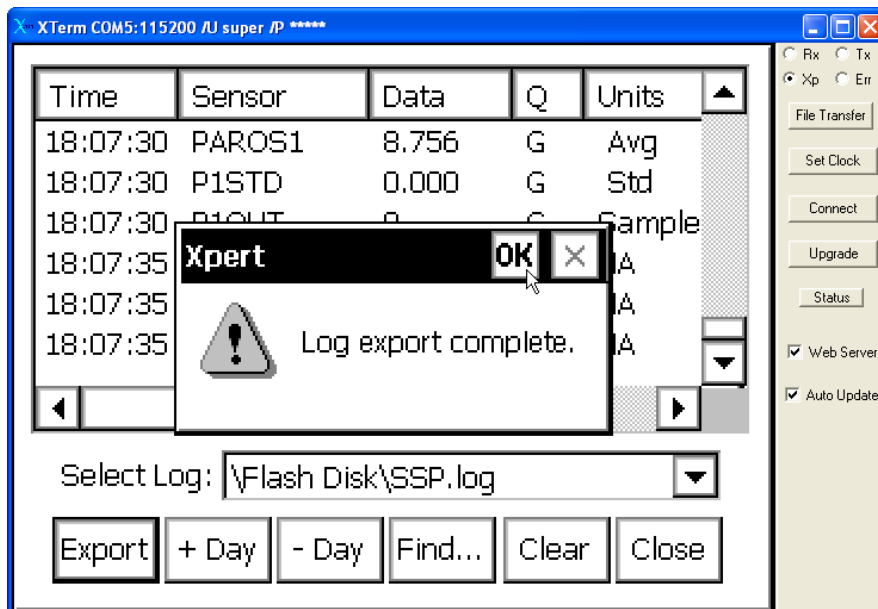
- 10) Browse to a location **on your machine** to save the file. It's recommended to leave the file name as the default SSP.txt until after the download and then change the name to something station specific after the file is on your computer. Click Save.



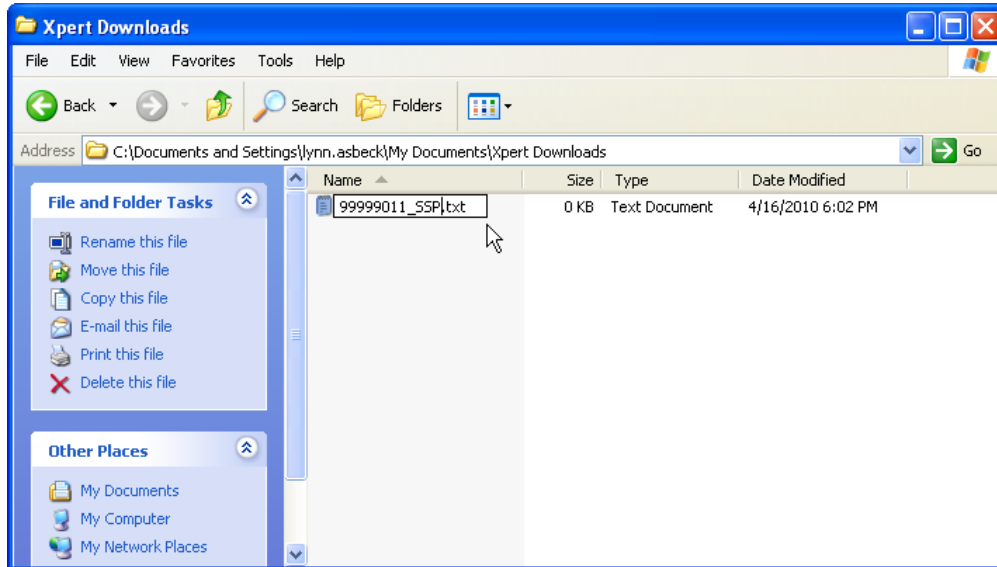
If the Xpert prompts you to save the file to Dir: \Flash Disk\, DO NOT SAVE the file as it can fill the Flash Disk and cause the system to become unstable and/or crash. This is a known glitch in the Xterm software that occasionally happens. If this occurs, simply cancel out of the File Name screen and restart the export procedure.



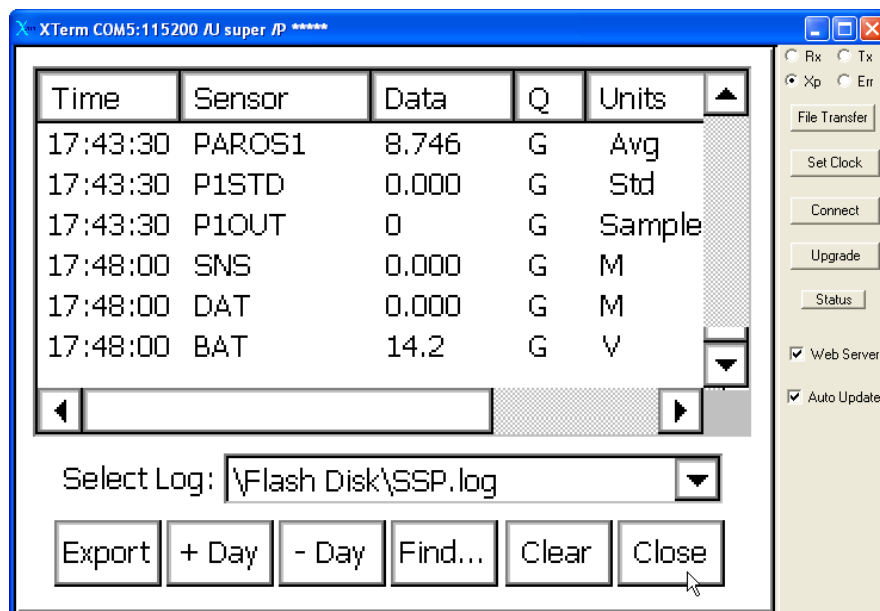
- 11) After your log is saved to the appropriate folder on your computer, click the OK button when notified that the export is complete.



- 12) At this time, you can to browse to the location where the file was saved to verify that the desired data are present in the .txt file. It's also a good time to change the name to something like 99999011_SSP.txt (where 99999011 is the Station ID) so that it will be uniquely identifiable.

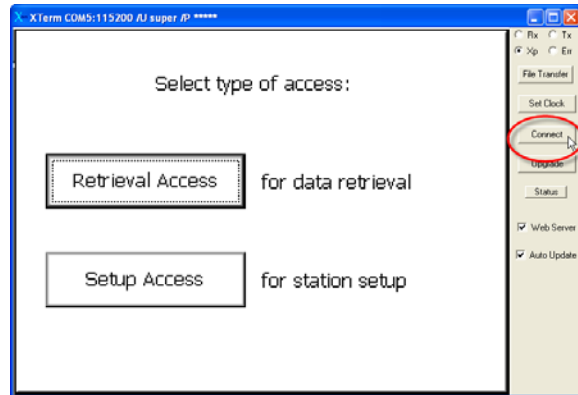
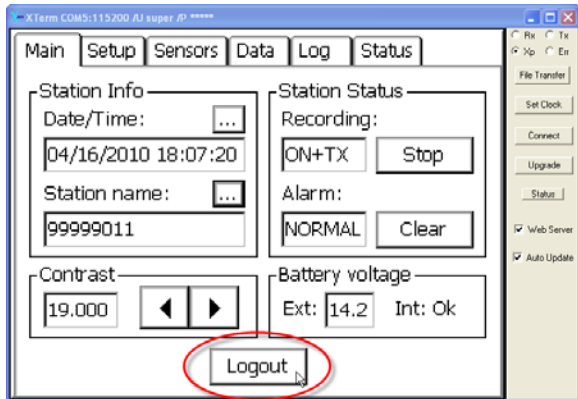


- 13) After you know the data have been exported, go back to Xterm and click the Close button on the bottom right corner of the Log screen. Log export is complete!



14) Disconnect from the gauge as before:

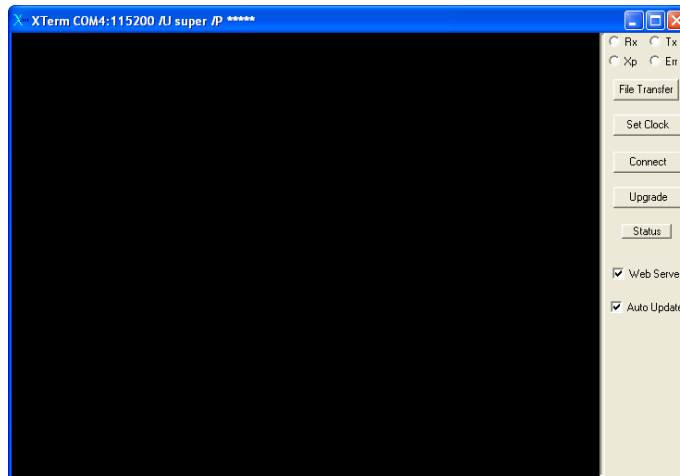
- a. Click the Logout button on the bottom of the Main tab
- b. Click the Connect button on the type of access screen to disconnect
- c. Close out of Xterm and disconnect your cable. Secure 9210B and Portable Tide Gauge enclosures.



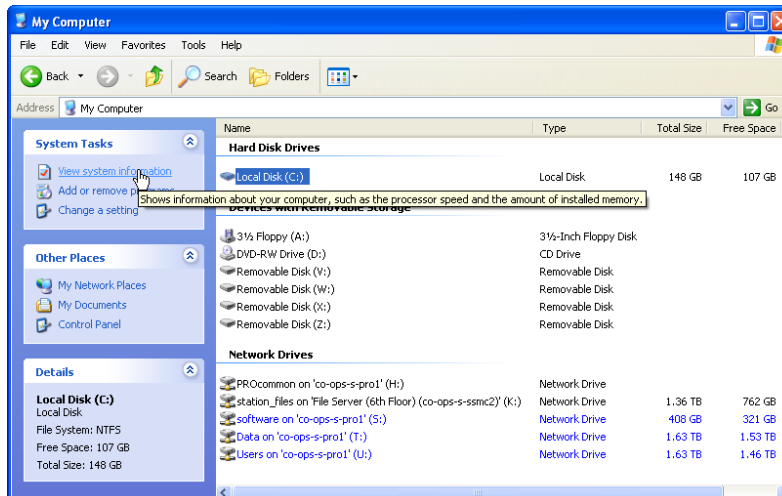
V. Common Troubleshooting Procedures

Use these procedures to attempt to repair a malfunctioning gauge. Alternately you may contact the Seattle Instrument Lab at SIL@noaa.gov or 206.526.6915 or 206.526.6360.

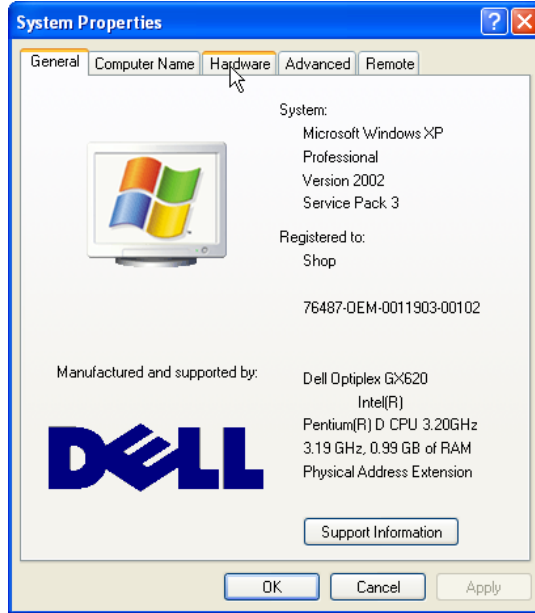
- 1) **SYMPTOM:** Persistent black screen during boot up (usually accompanied by only the Tx button flashing)



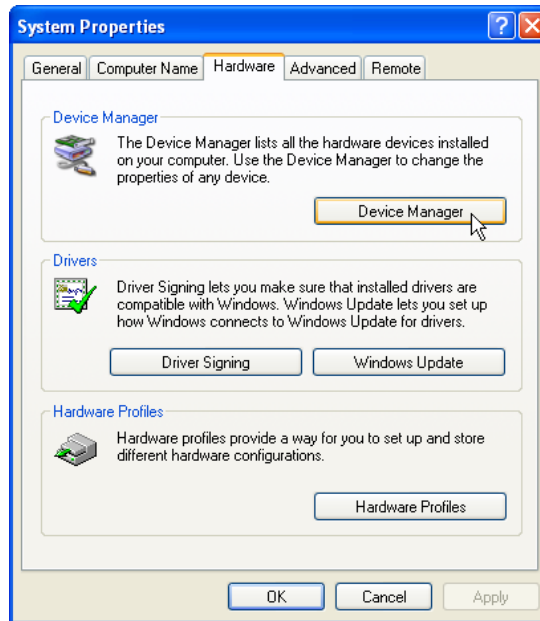
- Check the Xpert to make sure that its fuse is engaged
- Check your cable to make sure you are connected to the Xpert in COM 1
- Check your computer's COM port to make sure that the port you've selected in Xterm is the port you are using. To find out more information about your COM ports:
 - Go to My Computer
 - Single click on Local Disk (C:) and choose "View system information" on the left hand bar



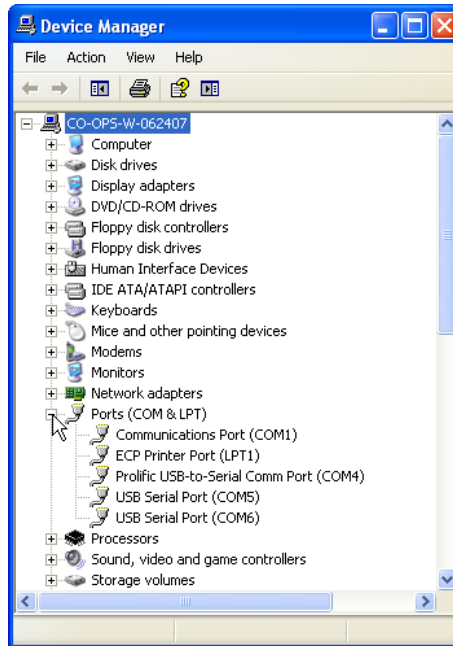
- In the “System Properties” window that pops up, choose the “Hardware” tab.



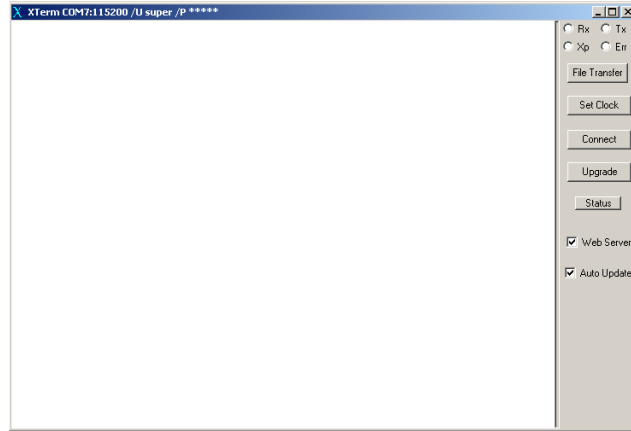
- Click on “Device Manager”



- Scroll down to “Ports (COM & LPT)” and expand using the [+] box
- Ensure that Xterm is set to the appropriate COM Port shown



2) SYMPTOM: Persistent white screen during boot up

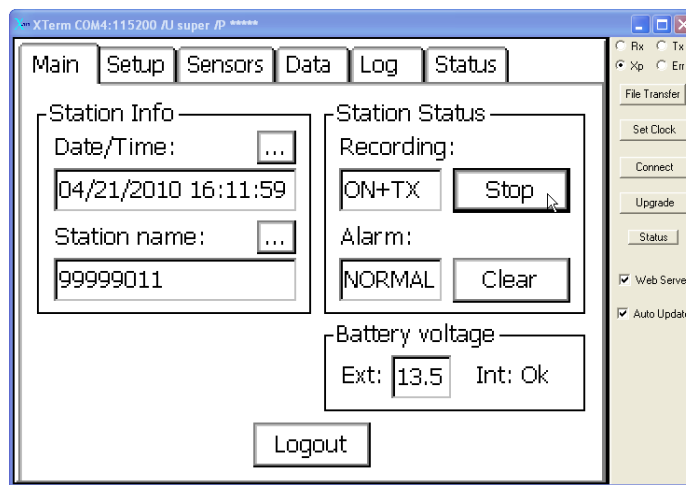


The Xpert does take a while to boot up and connect. In general, if you see the “Rx” and “Tx” buttons flashing, the Xpert is still booting. If the white screen persists for more than 10 minutes, try the following:

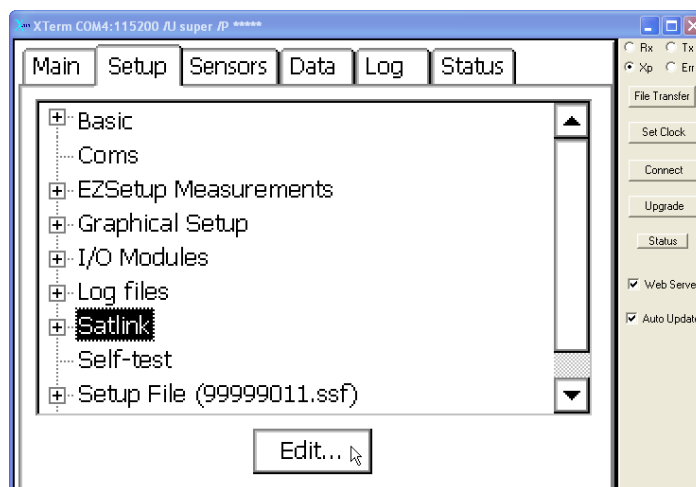
- Perform a “hard reboot” on the Xpert: disengage and reengage the 1 Amp fuse
- Contact the Seattle Instrument Lab at (206) 526-6915 for a walk through of re-loading the Xpert operating system

3) **SYMPTOM:** Not transmitting via GOES

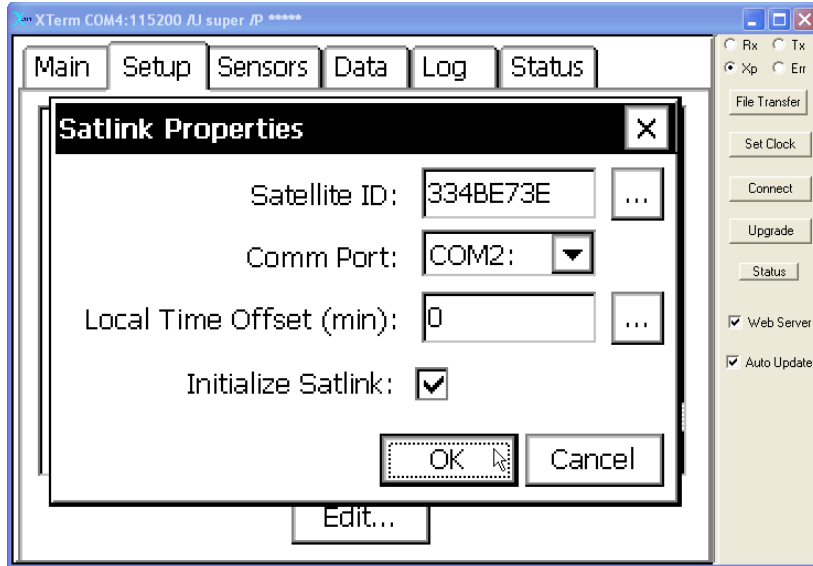
- Ensure that the GOES antenna has a clear line of sight to the satellite
- Double check your GOES connection cables at the antenna and at the Portable Tide Gauge enclosure. Also double check the connection inside the PTG enclosure between the Pelican case and the 9210B DCP (small black cable).
- Ensure that the GPS antenna is installed and all connections are good
- Double check the platform ID information in the Xpert Setup:
 - In the Recording section of the Main tab, click “Stop” to stop logging.



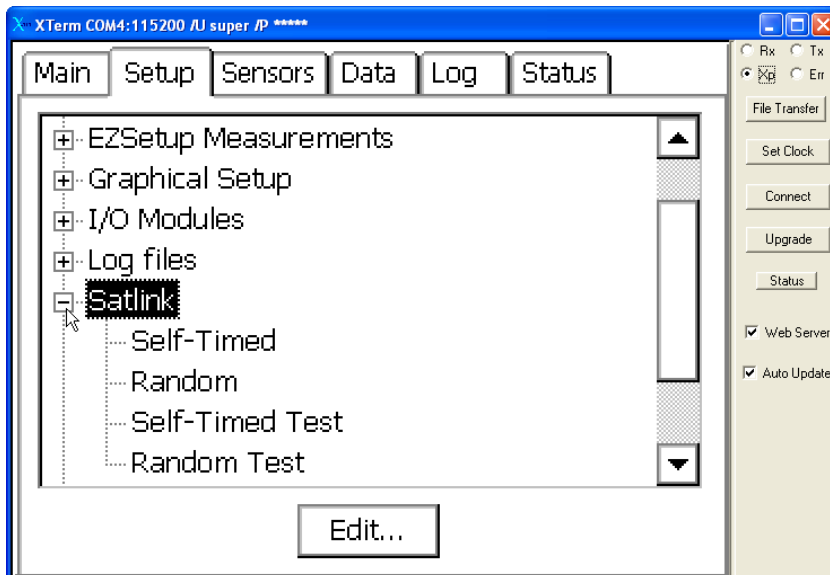
- Click on the Setup tab, scroll to find the Satlink section and click “Edit...” For this you do not need to click on the [+] to expand the Satlink folder.



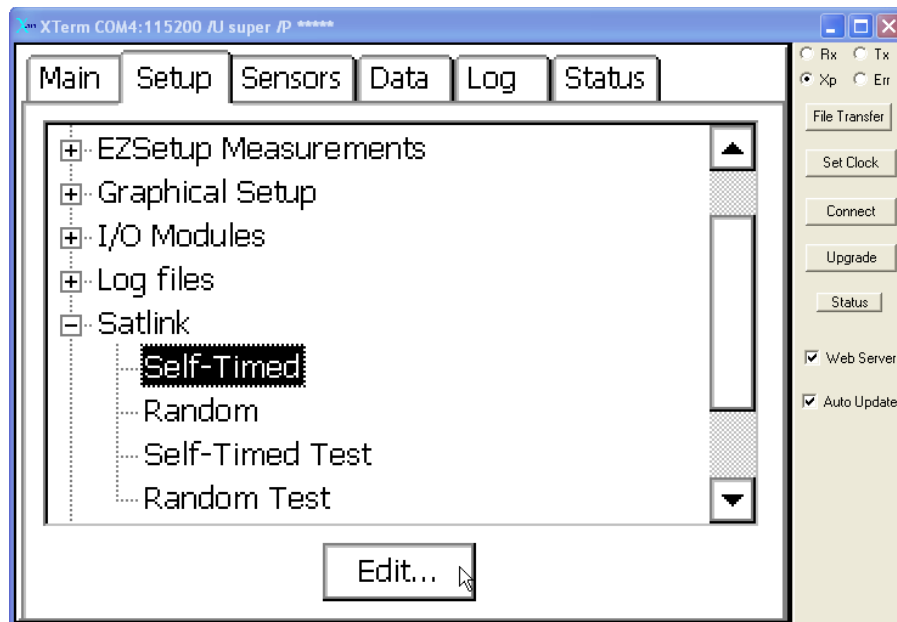
- In the “Satlink Properties” window that appears, double check your Satellite ID (also called Plat ID or Platform ID). Change as needed and click “OK”.



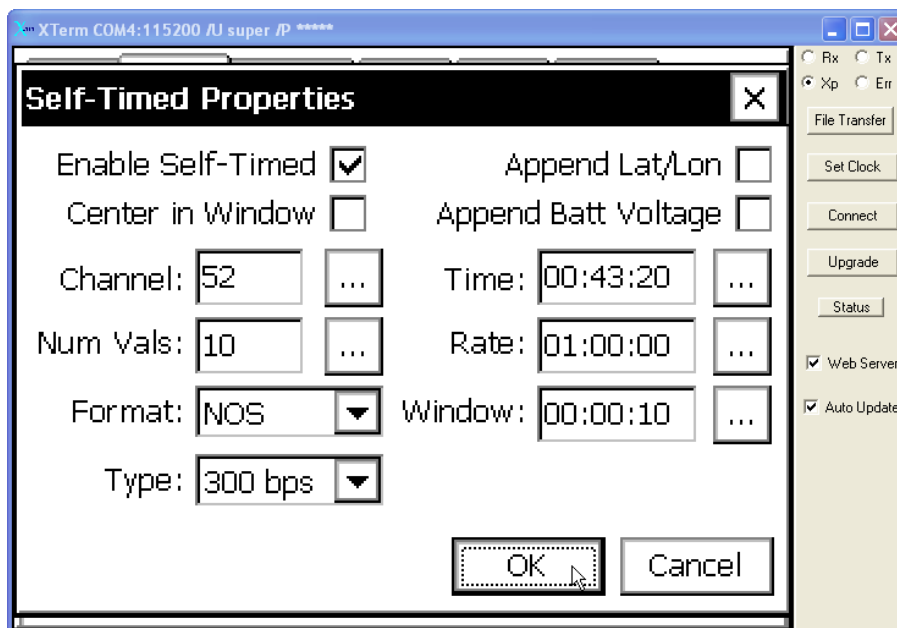
- Back in the Setup tab, find the Satlink section and click on the [+] next to Satlink to expand the directory.



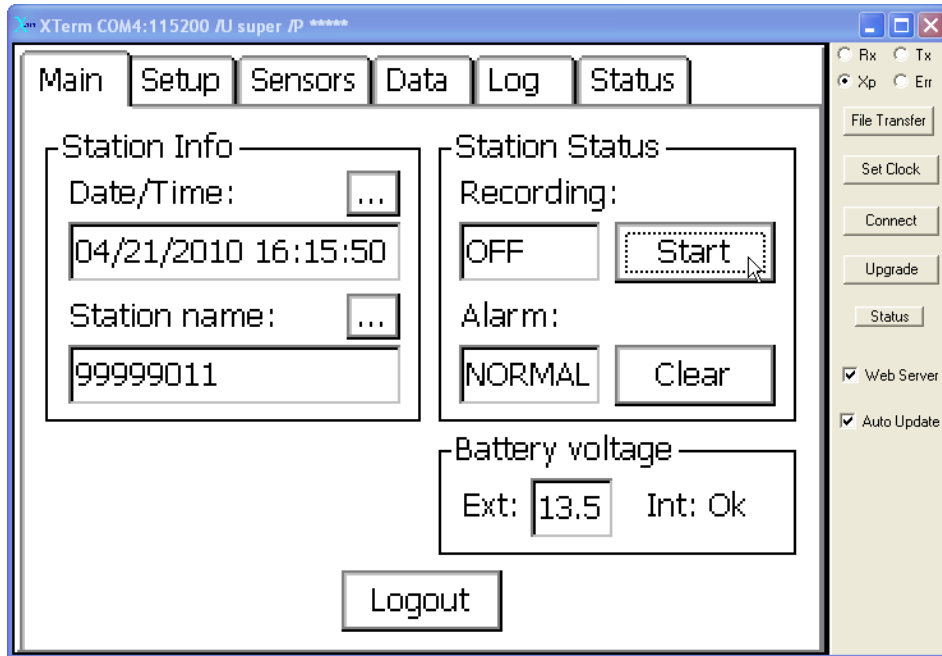
- Check the other properties of the transmission by choosing “Self-Timed” and clicking “Edit...”



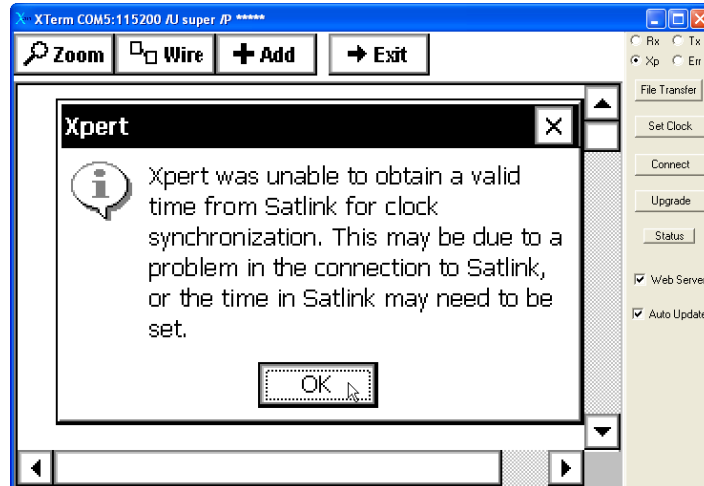
- The “Self-Timed Properties” window contains the GOES transmissions channel, transmission time, rate, window length, and transmission baud rate (“Type”). Times are in HH:MM:SS. Double check these properties. If they vary from what is shown on the inside of the DCP door adjust as necessary and click “OK.”



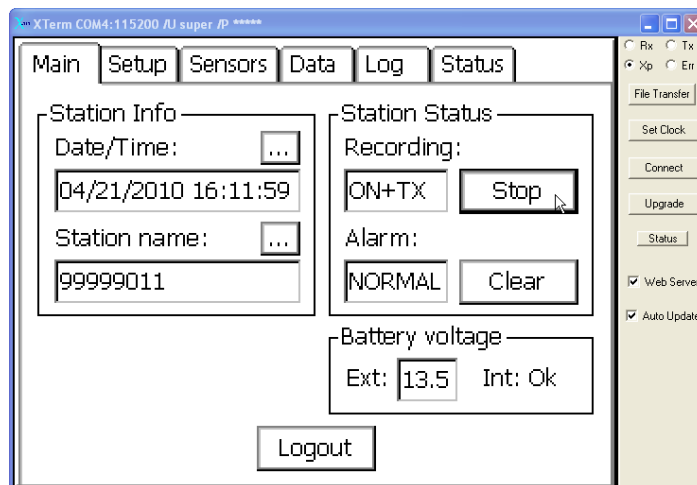
- Return to the Main tab and click on “Start” to start recording and see if your changes have solved the problem.



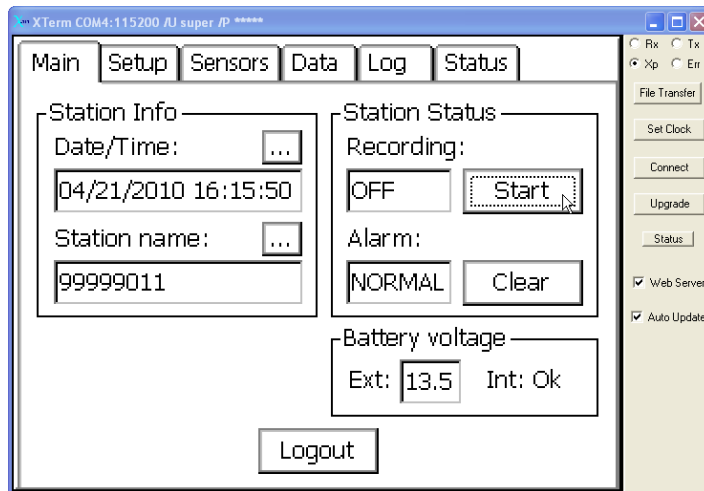
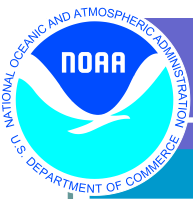
4) SYMPTOM: GPS time synch error



- Log onto the system as usual.
- Turn recording and transmissions off



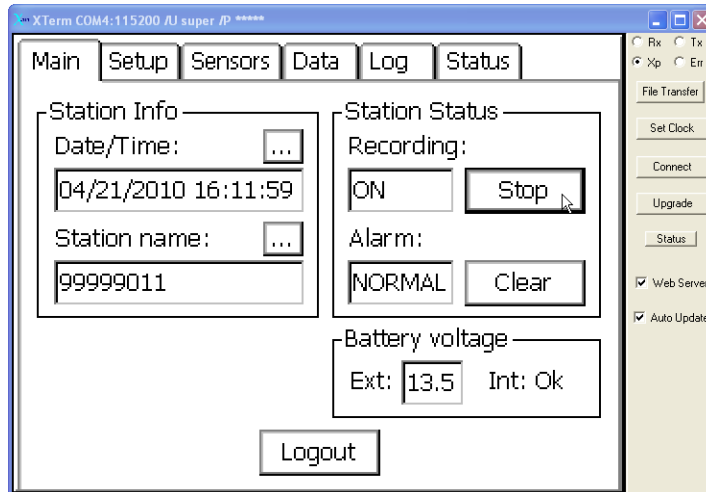
- Check the GPS cable connection to the Portable Tide Gauge enclosure and the light brown GPS cable inside the 9210B DCP enclosure.
- In the 9210B DCP enclosure, double check that the flat blue COM cable running between the Satlink module and the DCP's COM 2 port is connected.
- Turn recording back on to see if the time synch has been resolved. You may need to turn recording off and on twice.



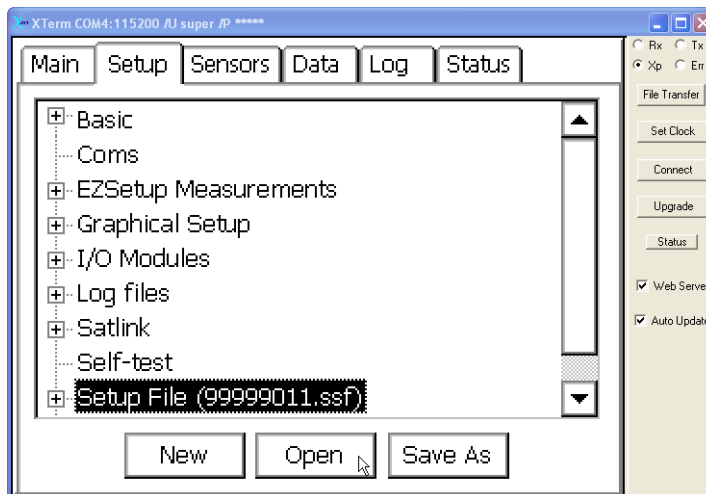
5) SYMPTOM: Recording “ON” not “ON+TX”

Try reloading the setup file:

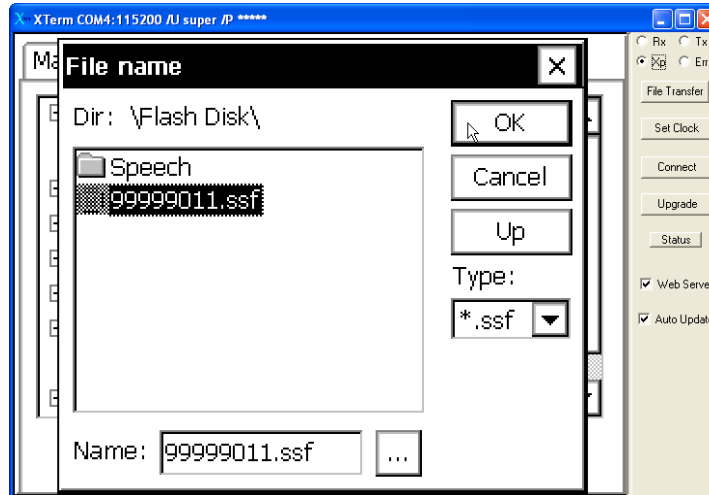
- In the Recording section of the Main tab, click “Stop” to stop logging.



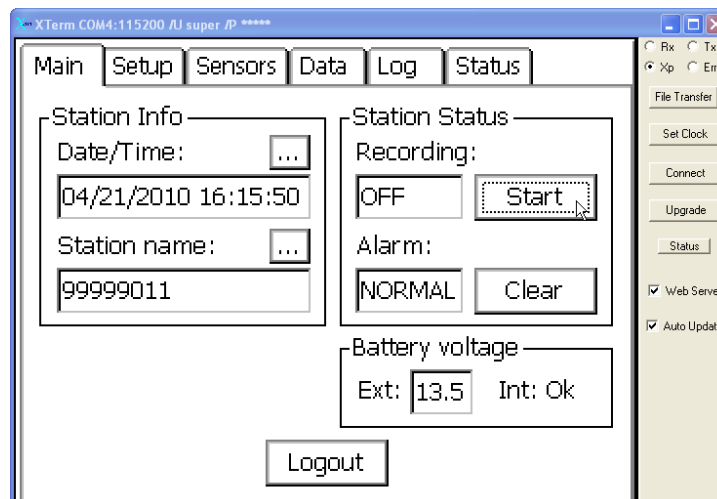
- Click on the Setup tab, scroll to find “Setup File (99999011.ssf)” and click “Open”



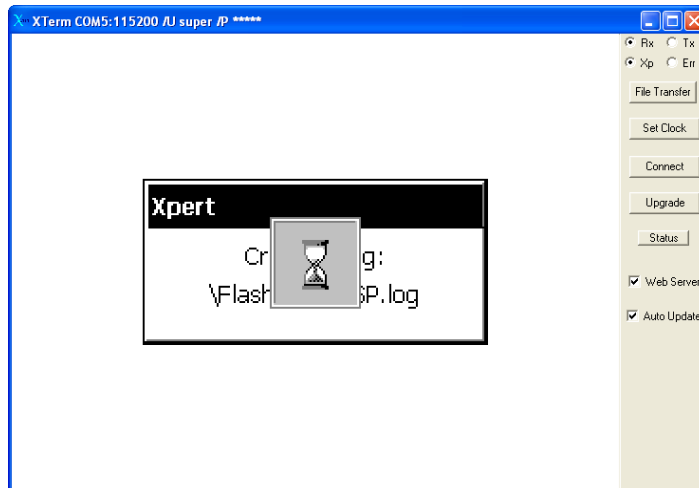
- In the “File name” window that pops up, select your setup file and click “OK”



- After the file is reopened, click back on the “Main” tab and click “Start” to restart recording and logging. It should now say “ON+TX”.



6) **SYMPTOM:** Xpert does not find a log file and creates it on its own



This is fine. This occurs if a log file is deleted from the SD storage card or Xpert flash disk. The Xpert will recreate the missing file for you; however it may take a LONG time. So, go get a cup of coffee or enjoy the scenery while the Xpert works.

- 7) **Quality Assurance/Control:** Problems with the PTG units or any erroneous content in this SOP should be directed to the Seattle Instrument Lab (SIL) via email (sil@noaa.gov) or phone (206-526-6915, 206-526-6923, or 206-526-6360).
- 8) **Management/Responsibility:** The Seattle Instrument Lab (SIL) Team Lead is responsible for maintaining this SOP.