CatLog 2 – Manual (preliminary version)

Know your device:

The Catlog 2 is equipped with high sensitive GPS receiver and permanent memory to store positions. The device has been optimized for energy efficiency and size. A micro USB interface is used for data exchange and charging. While a regular Micro USB cable is sufficient to charge the device a special communication cable is required to read and configure the device.

The device has 2 LED lights. The green one will show the operation state while the orange one shows charge operation. The LED lights can be configured to stay off in operation.

The device is enabled and disabled by a magnetic switch. Since the main purpose of Catlog 2 is for scientific research an magnetic switch is the most convenient method to turn the device on or off in a hermetically sealed enclose (e.g. ThermoSeal).

Installation of Device driver and Control Center:

Step 1: Install PL2303 USB-Serial driver (unzip PL2303_Prolific_DriverInstaller_v1.5.0.zip and start executable)

If you are using Windows 8 follow the instruction here: http://www.rei-labs.net/installing-pl2303-hxa-driver-on-windows-8/

Step 2: Locate file "MSCOMM32.OCX" in Windows \ System32 folder. Replace with MSCOMM32.OCX supplied by this program.

Step 3: Right click on CATLOG.EXE, select Properties. Click on tab "Compatibility", set check mark "Run this program in compatibility mode", select "Windows XP (service Pack 2)". Select "Apply", "OK".

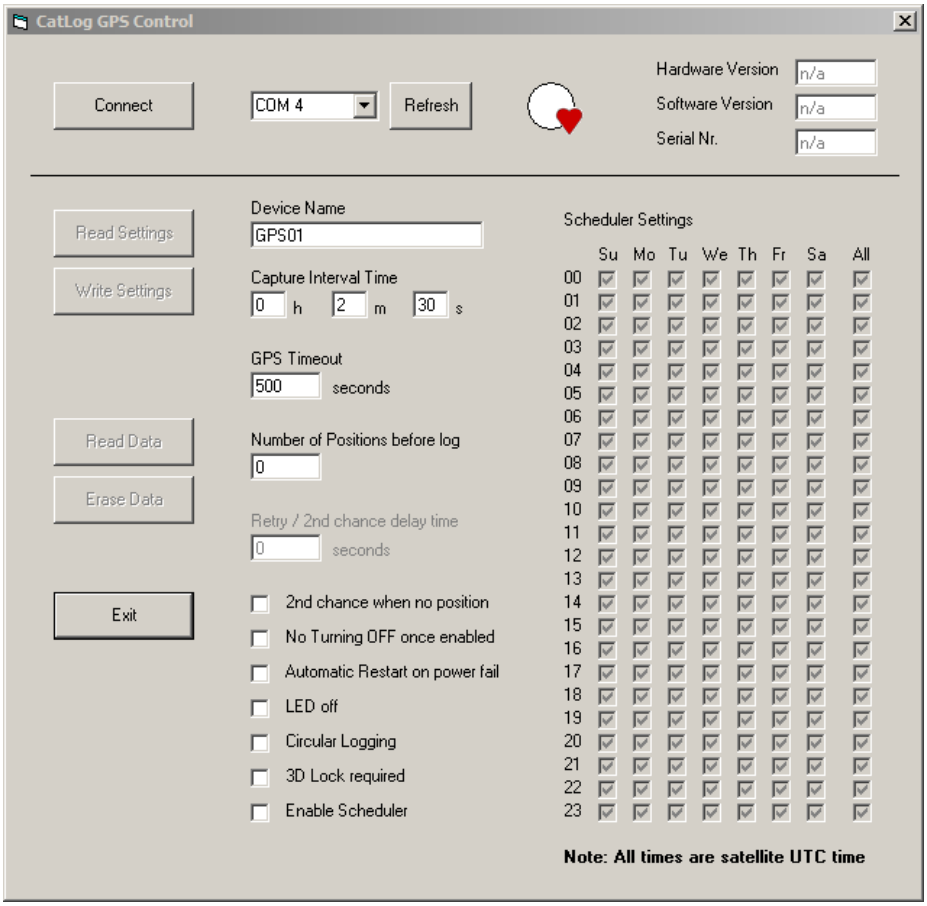
Now you can start CATLOG.EXE

Connecting GPS Device:

Step 1: Plug in PL2303 serial communication USB cable, Click „Refresh“, Select COM port (usually highest one). This step only needs to be done once per session.

Step 2: Connect device to USB cable. Check if green light turns on and stays on. If not activate switch so that device turns on (green light stays on).

Step 3: Click “Connect”. Heartbeat indicator should turn red, buttons in the configuration section should be enabled after some seconds, device information (hardware, software, serial) should be updated.



Disconnecting GPS Device:

The former „Connect“ Button turned into „Disconnect“. Once you are done with the device, click “Disconnect”. You can now unplug the device from the USB cable. If you plan to work with other devices do not remove the USB cable from the computer. You can simply plug the USB cable into the next device. Continue with Step 2 of Section “Connecting USB Device”.

Device configuration:

If you want to read the settings from the connected GPS device, press button “Read Settings”. The options panel will then display the settings and allows you to modify them. You can also copy the settings from one device to an other one. In that case do not read the settings of the device to be configured. Instead, press “Write Settings”. Please refer to the following sections that explain the different operation modes and options.

Operation modes

The device supports 2 different operation modes:

- Standard Interval mode
- Weekly scheduled mode

Standard Interval mode:

This mode wakes up the device periodically and takes a position. The time is defined by “Capture Interval Time”. The interval is not synchronized, meaning it is free running.

Weekly scheduled mode:

Based on a weekly calendar the GPS device can be enabled for certain hours a day or certain days a week. This option will make the system acquire the GPS date and time to synchronize the operation. When the GPS is enabled by the scheduler it will use the “Capture Interval Time” to log positions. Care must be taken that the capture interval time is shorter than the available time window defined in the scheduler (e.g. time window set to 1 to 2 o’clock = 1 hour, capture time interval needs to be smaller for example 45min).

Note: the GPS time is UTC time, all settings in the scheduler will use UTC time and not local time. You need to adjust the scheduler based on your local time if required.

Accuracy and Energy consumption considerations

The GPS receiver requires some time depending on reception conditions to acquire the current position. Under some circumstances the GPS receiver may take a long time to get a position, e.g. when device is under water. Since the receiver will operate in the highest power state to scan the GPS satellite signals the battery will drain significantly. To prevent this the time to get a valid position can be limited. This is set using the GPS Timeout. This time should not be shorter than 60s because this option can limit the receiver to a point there no position at all can be acquired keeping the GPS device in an unproductive endless loop.

If reception conditions are unfavorable and the GPS device can not get a valid position within the GPS Timeout time the device can be configured to try it a second time. This is especially useful if the main Capture Interval time is long and the GPS device would only log a few positions every day. To have such kind of backup, enable option “2nd chance when no position”. Now the time defined by “Retry / 2nd chance delay time” will enable the GPS device allowing the system to gather a position outside the regular capture interval.

Once the GPS device is receiving valid signals and is able to determine the current position several options are available to increase the accuracy of the position. In general terms, the longer the GPS receiver is enabled the better the position will get but the more energy is required.

One option to significantly increase the accuracy is to select “3D Lock required”. For this 3 dimensional position at least 4 different satellites are required. For a “simple” 2D position only 3 satellites are required. The GPS receiver usually starts searching for one satellite, reads the date and time and then searches for possible other satellites based on a predicted constellation. So the normal sequence is 2D lock and if more satellites are received 3D lock and then switch to tracking the satellites with the best signal.

An other option for accuracy improvement is to increase the “Number of Positions before log”. Once the minimum number of satellites (see 2D/3D lock) is met the GPS device will count the number of valid positions until the position is recorded. This allows the GPS receiver to find enough satellites to improve the calculation of the current position.

Additional options:

Device name: allows to give each device a specific name. This comes handy if multiple devices are used.

No turning OFF once enabled: This options prevents the device from being disabled once it was switched ON. The device will need to be connected to the control program and the option disabled before it can operated in the conventional way. Preventing the device from getting switched off is useful for situations were either there is a danger of accidentally switching the device off (e.g. vibrations during operation) or disabling the device on purpose is prevented (stealth observation).

Automatic restart on power fail: If power fails the device will normally go into standby mode and will wait to get switched on. Enabling this option, the device will go into operation mode once power gets available. This option particularly makes sense if powered by secondary energy sources like solar energy.

LED off: enabling this option will disable the LED lights once the device is in operation mode. LED lights will still be visible during enabling, disabling and charge & communication. This option will save energy as well as will prevent disturbances while in operation.

Circular logging: normally the GPS device will record positions until the memory is full. With this option enabled the system will start erasing earlier positions once the end of the available memory is reached.

Read recorded positions:

Click on “Read Data” to read the stored position data of the connected GPS device. A dialog will open to choose a file name and output format. So far only CSV Excel text table format is supported.

Data is then be read from the device and decompressed. Depending on the amount of positions this will take a significant time. Since the device is using so called circular memory architecture it will not immediately recognize the end of the data stream. Therefore a stop button is present. If you see no increase of the position numbers for some seconds you can stop the download. However, if you have enabled “Circular Recording” you should wait until the software determines the end of available data.

Erase device memory:

To erase the data memory, press “Erase Data”. For safety purpose a dialog will ask you if you are sure. Note: erased data can not be restored.