Minion 4 - Special Operating Mode

Continuous OxyBase Sampling

The **oxybase_cont.py** python script which is part of the Minion_4 source code supports initiating a continuous sampling mode from the command line. The script accepts several arguments. The mode of operation (test or continuous) can be specified. The sample period argument is only used in continuous mode since in this mode the script does not use the sample period as defined in the configuration file. Additionally, arguments for enabling optional sensors (temperature, 30 bar pressure and 100 bar pressure) are accepted. The continuous mode is terminated by running another script, end_oxy.py. This script simply assigns False to the run_oxy variable in run_oxy_state.pickle file. In continuous mode, **oxybase_cont.py** checks the state of the run_oxy variable for each sample period. If a False state is detected, the continuous sampling will neatly terminate.

Usage

oxybase_cont.py [-h] [-m MODE] [-p PERIOD] [-t] [-br30] [-br100]

-h, --help	show this help message and exit
-m MODE, --mode MODE	Sampling Mode: TEST, CONT
-p PERIOD, --period PERIOD	Sampling Period in seconds
-t, --temperature	Enable Temperature Measurements
-br30, --press_30bar	Enable 30 bar Pressure Sensor Measurements
-br100, --press_100bar	Enable 100 bar Pressure Sensor Measurements

MODE	Description
test	Single Measurement Test Mode
cont	Continuous Mode

PERIOD
Sample period in seconds for use in continuous mode only. Minimum 2 seconds.

Note: The following examples assume that the user has navigated to the Documents/Minion_scripts directory.

Example: Running Test Mode

```
$ sudo python3 oxybase_cont.py -m test
```

Running Continuous Mode in the background after terminal connection is closed

The continuous mode is intended to operate in the background without a terminal connection. Typically, a script that is run from the terminal will be terminated automatically when the terminal is closed. To prevent the termination of the script when the terminal connection is closed requires two more options to be added to the command.

Example: Running test mode with No Hang Up and in the background. This would normally not be required but follows on from the above example.

```
$ sudo nohup python3 oxybase_cont.py -mode test &
```

nohup (from Wikipedia)
        POSIX command which means "no hang up". Its purpose is to execute a command such that it ignores the HUP (hangup) signal and therefore does not stop when the user logs out. Output that would normally go to the terminal goes to a file called nohup.out, if it has not already been redirected.

&
        Appending the & symbol to the end of the command signals to run the command in the background.

Example: Running Continuous Mode with a 2 second period with No Hang Up and in the background

```
$ sudo nohup python3 oxybase_cont.py -m cont -p 2 &
```

Once this command is entered, all prints that normally would be visible in the terminal window are directed to nohup.out. The terminal window can now be closed safely without terminating the script.

Example: Continuous Mode, 2 second sample period, temperature, 100 bar pressure with No Hang Up and in the background

```
$ sudo nohup python3 oxybase_cont.py -m cont -p 2 -t -br100 &
```


Example: Continuous Mode, 2 second sample period, temperature, 30 bar pressure, 100 bar pressure with No Hang Up and in the background

```
$ sudo nohup python3 oxybase_cont.py -m cont -p 2 -t -br100 -br30 &
```

Stopping the Continuous Mode

There are two methods of neatly stopping the continuous sampling mode.

1. Open a terminal window and navigate to the Minion_scripts directory. Then run the end_oxy.script.

```
$ cd Documents/Minion_scripts
~/Documents/Minion_scripts $ sudo end_oxy.py
```

2. Open a terminal window and run the alias end-oxy command

```
$ end-oxy
```

Once the script has been terminated with either of the methods above, the data can be downloaded from the Minion website.

File Naming Convention

000-YYYY-MM-DD_hh-mm-ss_OXY_CONT.txt

Where:

Field	Description
000	Always 000 for compatibility
YYYY	4-digit year
MM	2-digit month
DD	2-digit day
hh	2-digit hours
mm	2-digit minutes
ss	2-digit seconds
OXY	Denotes OxyBase Data
CONT	Denotes Continuous Sampling

Example: 000-2023-10-17_12-58-09_OXY_CONT.txt

File Format

The file contains a meta-record, data descriptors and data. The data descriptors and data are semi-colon delimited

Meta-record

data_format	,	file_name	,	sampling_period

data_format : $08 for continuous oxybase sampling mode
fiile_name :   As described in the file naming convention section
sampling_period :   Sampling period in seconds. Minimum 2 seconds

Data descriptors

Standard Data Descriptors:
epoch_secs;addr;amplitude;phase;temperature;oxygen;error

Optional Data Descriptors:
The following fields are appended to the standard data descriptors if the sensor is enabled. A non-enabled sensor will not be present in the data descriptor string.

temp_TSYS01;press_30bar;temp_30bar;press_100bar;temp_100bar;

Note: the data descriptors line was included for ease of importation into a program such as Matlab.

Base Measurement Data String

S	;	N	N0	;	A	N1	;	P	N2	;	T	N3	;	O	N4	;	E	N8	;

Optional Measurements Data String
The following fields are appended to the base measurement string if the sensor is enabled. A non-enabled sensor will not be present in the data string but will always be appended in the following order.

TS	;	P30	;	T30	;	P100	;	T100	;

List of abbreviations:

Code	Description
S	UNIX epoch seconds
N	code for begin of device address N0
N0	byte value of device address, no decimal places
A	code for begin of amplitude value N1
N1	long value of amplitude, no decimal places
P	code for begin of phase value N2
N2	integer value of phase, two decimal places
T	code for begin of temperature value N3
N3	integer value of temperature, two decimal places
O	code for begin of oxygen value N4
N4	integer value of oxygen, decimal places 2 (standard) or 4 (only for Oxygen Unit mg/L and ppm gas)
E	code for error value N5
N5	integer value of error code, no decimal places Bit 0 - Reference channel overflow Bit 1 - Reference CLR Status Bit 2 – Reference DRDY State Bit 3 – Signal channel overflow Bit 4 – Signal CLR Status Bit 5 – Signal DRDY State Bit 6 – No sensor calculation / Amplitude too low Bit 7 – Pulse Counter overflow Bit 8 – Reference Amplitude out of range Bit 9 – Signal Photo Detector Overflow Bit 10 – Reference Photo Detector Overflow Bit 11 – Memory Write Error detected Bit 12 – reserved Bit 13 – PME Interrupt error Bit 14 – PME Interval out of range Bit 15 – Input voltage out of range Bit 16 - CRC Error in Memory Sector #1 Bit 17 - CRC Error in Memory Sector #2 Bit 18 - CRC Error in Memory Sector #3 Bit 19 etc – reserved for future use

TS	TSYS01 temperature in celsius
P30	30 bar pressure sensor pressure in dbar
T30	30 bar pressure sensor temperature in celsius
P100	100 bar pressure sensor pressure in dbar
T100	100 bar pressure sensor temperature in celsius

Example Data files:

Configuration: mode = cont, period = 2, temperature = False, bar30 = False, bar100 = False

$08,000-2023-10-17_12-58-09_OXY_CONT.txt,2
epoch_secs;addr;amplitude;phase;temperature;oxygen;error
1697561895;N01;A0000369;P-119;T2395;O000000;E00000320;
1697561897;N01;A0001070;P-988;T2395;O-30814;E00000256;
1697561899;N01;A0000753;P-124;T2398;O000000;E00000320;
1697561901;N01;A0000525;P-359;T2398;O000000;E00000320;

Configuration: mode = cont, period = 2, temperature = True, bar30 = False, bar100 = True

$08,000-2023-10-30_11-56-12_OXY_CONT.txt,2
epoch_secs;addr;amplitude;phase;temperature;oxygen;error;temp_TSYS01;press_100bar;temp_100bar;
1698681377;N01;A0000931;P-564;T2407;O000000;E00000320;022.870;010.580;022.300;
1698681379;N01;A0001023;P-646;T2410;O-42347;E00000256;022.870;010.580;022.250;
1698681381;N01;A0001054;P-619;T2412;O-43804;E00000256;022.870;010.580;022.300;
1698681383;N01;A0001045;P-556;T2415;O-47746;E00000256;022.870;010.549;022.250;

Configuration: mode = cont, period = 2, temperature = False, bar30 = False, bar100 = True

$08,000-2023-10-30_11-52-39_OXY_CONT.txt,2
epoch_secs;addr;amplitude;phase;temperature;oxygen;error;press_30bar;temp_30bar;press_100bar;temp_100bar;
1698681165;N01;A0000160;P-133;T2265;O000000;E00000320;000.264;022.750;010.549;022.300;
1698681167;N01;A0000732;P-696;T2295;O000000;E00000320;000.265;022.750;010.580;022.200;
1698681169;N01;A0001059;P-675;T2309;O-41472;E00000256;000.259;022.760;010.580;022.250;
1698681171;N01;A0000073;P-279;T2315;O000000;E00000320;000.262;022.760;010.549;022.200;