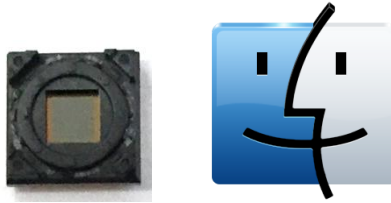


NSP32 SDK

Installation Manual

on **Mac OS**



ver 1.7

nanoLambda

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Introduction

This user manual is formulated to briefly explain how to setup the working environment for collecting the data from the NSP32 spectral sensor.

To use NSP32 spectral sensor for your spectral sensing application, you need to install few pre-requisite tools for measurement and/or experimentation. The development environment is tested on Mac OS X 10.10.5(Yosemite) and El Capitan(10.11.5).

In this manual, we will explain briefly

1. how to configure your IDE(e.g., NetBeans) for application development
2. how to build/test your C/C++ example or application on Mac.
3. how to install/run 'PrismEx' Gui application.

Preliminary Settings On Mac

Install IDE (NetBeans) for compilation of examples

nanoLambda used below version of NetBeans for development, and the example project which is included in NSP32 SDK is also tested with this version of NetBeans only. So, if you want to use different version of NetBeans or other IDE, it's up to you. In that case, you need to configure the IDE environment by your own.

Here is the list for your installation of IDE.

Install JDK (Java Development Kit) 7 for NetBeans IDE:

- `jdk-7u75-nb-8_0_2-macosx-x64.dmg` (for NetBeans)
- : after loading above dmg file and you can run NetBeans 8.0.2 with JDK 7 Update 75.pkg

Install NetBeans 8.0.2:

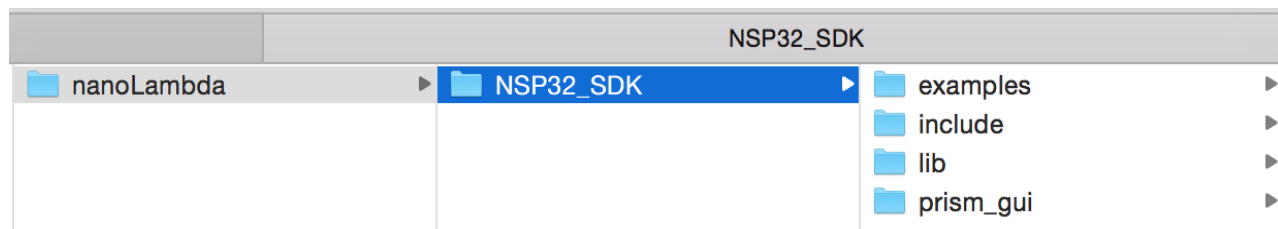
- `netbeans-8.0.2-cpp-macosx.dmg` (NetBeans for C++)
- : after loading above dmg file and you can run NetBeans 8.0.2.pkg

Install NSP32 SDK for Mac

Current NSP32 SDK is tar format file. To install NSP32 SDK on Mac, just untar the file to your local directory:

```
$ tar xvf ./NSP32_SDK_1_7_package.tar.gz
```

After untar the file, you can find below paths in that path.



Here are the contents in the installed path.

- `prism_gui` : has PrismEx.dmg - GUI application for NSP32 sensor
- `examples` : have sample examples for using NSP32 sensor - for NetBeans

For testing low level API, you can use below examples.

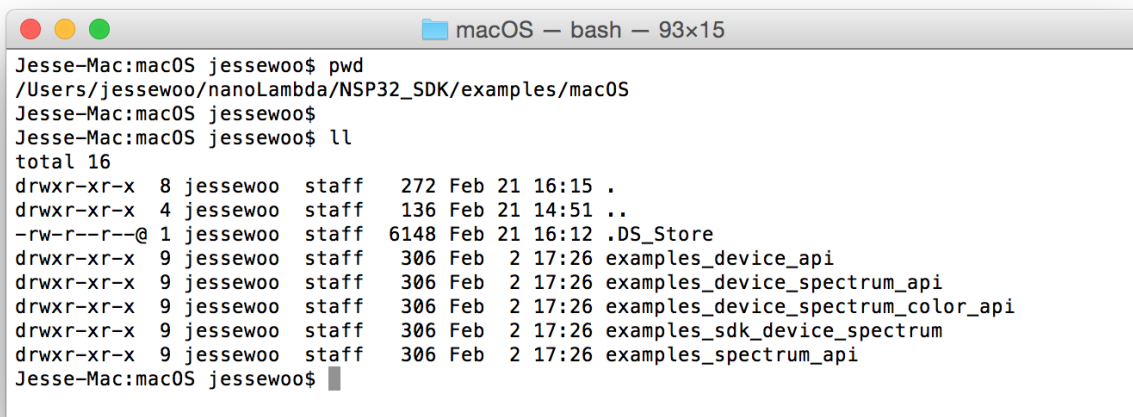
```
- examples_device_api.cpp
- examples_device_spectrum_api.cpp
- examples_device_spectrum_color_api.cpp
- examples_spectrum_api.cpp
```

For testing high level API, you can use below example.

```
- examples_sdk_device_spectrum.cpp
```

For getting more information, you can refer below document.

"NSP32 SDK C C++ Developer Guide-v1.7.pdf"



```
macOS — bash — 93x15
Jesse-Mac:macOS jessewoo$ pwd
/Users/jessewoo/nanoLambda/NSP32_SDK/examples/macOS
Jesse-Mac:macOS jessewoo$
Jesse-Mac:macOS jessewoo$ ll
total 16
drwxr-xr-x  8 jessewoo  staff   272 Feb 21 16:15 .
drwxr-xr-x  4 jessewoo  staff   136 Feb 21 14:51 ..
-rw-r--r--@ 1 jessewoo  staff  6148 Feb 21 16:12 .DS_Store
drwxr-xr-x  9 jessewoo  staff   306 Feb  2 17:26 examples_device_api
drwxr-xr-x  9 jessewoo  staff   306 Feb  2 17:26 examples_device_spectrum_api
drwxr-xr-x  9 jessewoo  staff   306 Feb  2 17:26 examples_device_spectrum_color_api
drwxr-xr-x  9 jessewoo  staff   306 Feb  2 17:26 examples_sdk_device_spectrum
drwxr-xr-x  9 jessewoo  staff   306 Feb  2 17:26 examples_spectrum_api
Jesse-Mac:macOS jessewoo$
```

- `include` : have header files for your development
- `lib` : have all library files for your development

Libraries developed by nanoLambda

```
- libCrystalBase-macos-NB.dylib
- libCrystalBox-macos-NB.dylib
- libCrystalCore-macos-NB.dylib
- libCrystalPort-macos-NB.dylib
```

Libraries developed by 3rd party

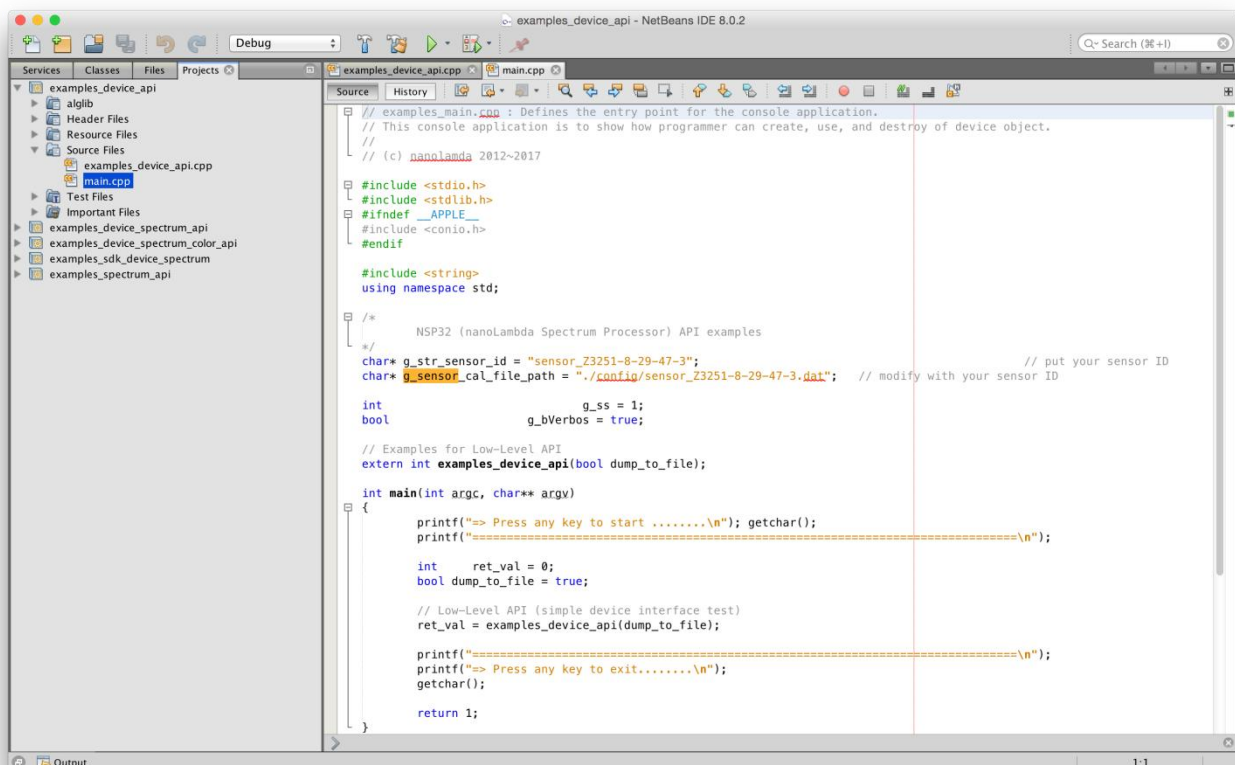
```
- libgslxx.dylib
- libusbxx.dylib
```

```
Jesse-Mac:lib jessewoo$ ll
total 13880
drwxr-xr-x  10 jessewoo  staff    340 Jan 25 16:36 .
drwxr-xr-x   7 jessewoo  staff    238 Jan 24 15:22 ..
-rw-r--r--   1 jessewoo  staff   6148 Jan 24 15:21 .DS_Store
-rwxr-xr-x   1 jessewoo  staff  16524 Jan 25 16:35 libCrystalBase-macos-NB.dylib
-rwxr-xr-x   1 jessewoo  staff  29540 Jan 25 16:35 libCrystalBox-macos-NB.dylib
-rwxr-xr-x   1 jessewoo  staff 3713388 Jan 25 16:35 libCrystalCore-macos-NB.dylib
-rwxr-xr-x   1 jessewoo  staff  613172 Jan 25 16:35 libCrystalPort-macos-NB.dylib
-rwxr-xr-x   1 jessewoo  staff  2327252 Jan 25 16:35 libgsl.0.dylib
-rwxr-xr-x   1 jessewoo  staff  299036 Jan 25 16:35 libgslcblas.0.dylib
-rwxr-xr-x   1 jessewoo  staff   81188 Jan 25 16:35 libusb-1.0.0.dylib
Jesse-Mac:lib jessewoo$
```

How to build and run examples

Load Example project to Netbeans IDE

Now you can load sample example for testing NSP32 sensor. Run NetBeans and load `examples_xx` project from `./nanoLambda/NSP32_SDK/examples/macOS` folder.



```
// examples_main.cpp : Defines the entry point for the console application.
// This console application is to show how programmer can create, use, and destroy of device object.
// (c) nanoLambda 2012~2017

#include <stdio.h>
#include <stdlib.h>
#ifdef __APPLE__
#include <unistd.h>
#endif

#include <string>
using namespace std;

/*
 * NSP32 (nanoLambda Spectrum Processor) API examples
 */
char* g_str_sensor_id = "sensor_Z3251-8-29-47-3"; // put your sensor ID
char* g_sensor_cal_file_path = "./config/sensor_Z3251-8-29-47-3.dat"; // modify with your sensor ID

int g_ss = 1;
bool g_bVerbose = true;

// Examples for Low-Level API
extern int examples_device_api(bool dump_to_file);

int main(int argc, char** argv)
{
    printf("=> Press any key to start ..... \n");
    printf("===== \n");

    int ret_val = 0;
    bool dump_to_file = true;

    // Low-Level API (simple device interface test)
    ret_val = examples_device_api(dump_to_file);

    printf("===== \n");
    printf("=> Press any key to exit ..... \n");
    getchar();

    return 1;
}
```

Modify source codes and compile

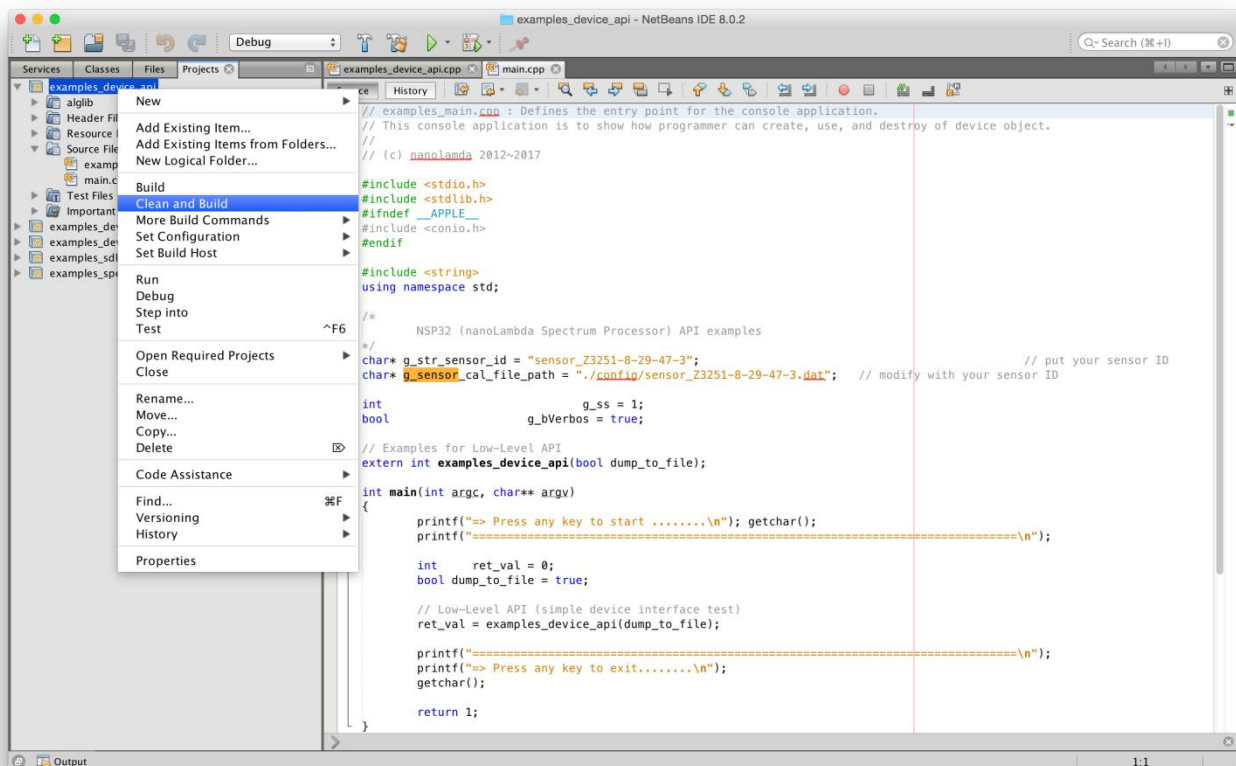
After loading the Examples project, you need to modify the source code for using your NSP32 sensor module.

- 1) First open file named 'main.cpp'
- 2) After that, you need to modify below 'sensor_XXXXX-X-XX-XX-X' parts with your own sensor information for loading proper sensor data
- 3) nanoLambda provides specific sensor data for each NSP32 sensor module

```
char* g_str_sensor_id = "sensor_Z3251-8-26-41-3";  
char* g_sensor_cal_file_path = "../config/sensor_Z3251-8-26-41-3.dat";
```

Now you are ready to use your NSP32 sensor for testing examples.

After modification is done, just run 'Clean and Build' for Examples project on NetBeans IDE



Copy sensor data to config folder

Now you need to copy proper sensor specific data(ex: sensor_ZXXXXX-X-XX-XX-X.dat) to below path.

```
./nanoLambda/NSP32_SDK/examples/macOS/examples_device_api/dist/Debug/
GNU-MacOSX/config
```

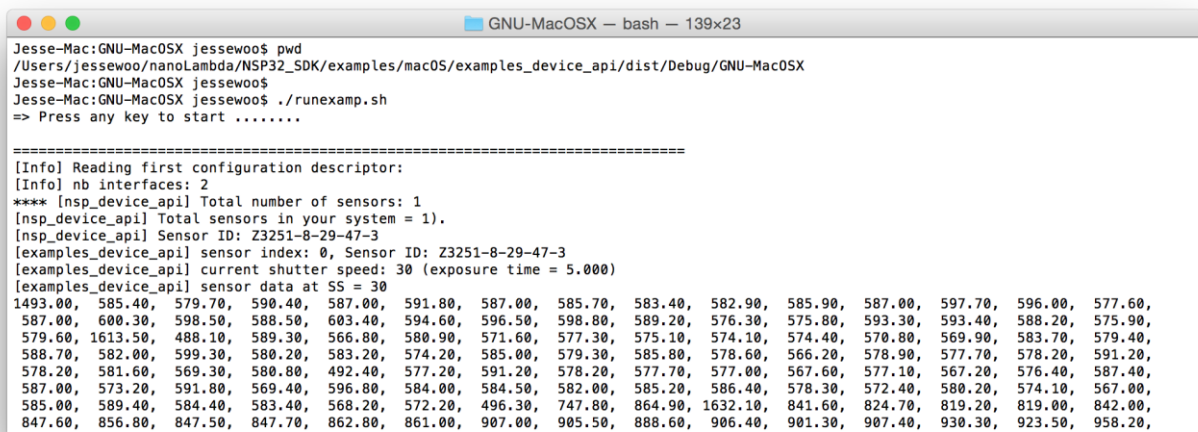
and, you need to copy the sensor specific data to each config folder in different example path.

Ready to Run example

It's ready to run example. Just run 'runexamp.sh' that is located in below path.

```
./nanoLambda/NSP32_SDK/examples/macOS/examples_device_api/dist/Debug/
GNU-MacOSX/runexamp.sh
```

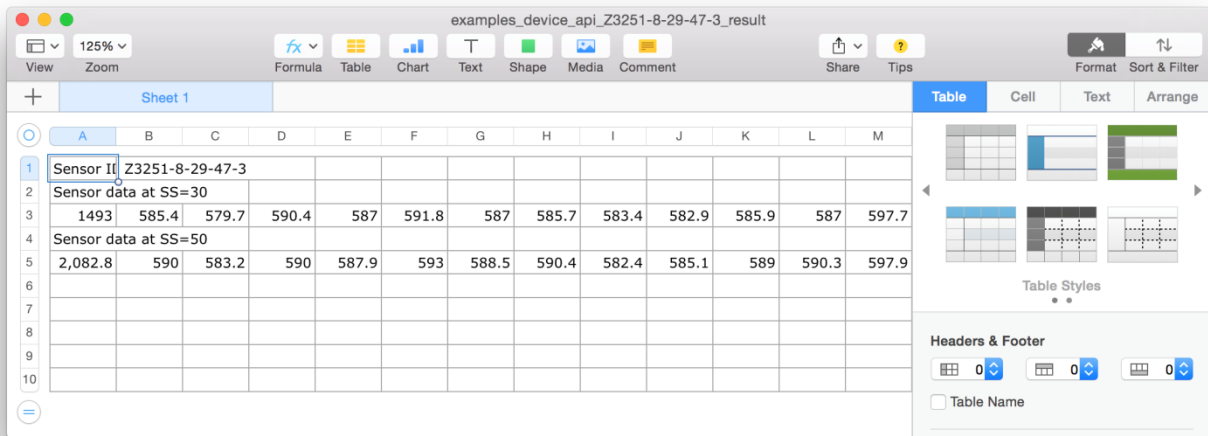
Here is the snapshot for running example.



```
Jesse-Mac:GNU-MacOSX jessewoo$ pwd
/Users/jessewoo/nanoLambda/NSP32_SDK/examples/macOS/examples_device_api/dist/Debug/GNU-MacOSX
Jesse-Mac:GNU-MacOSX jessewoo$
Jesse-Mac:GNU-MacOSX jessewoo$ ./runexamp.sh
=> Press any key to start .....

=====
[Info] Reading first configuration descriptor:
[Info] nb interfaces: 2
**** [nsp_device_api] Total number of sensors: 1
[nsp_device_api] Total sensors in your system = 1).
[nsp_device_api] Sensor ID: Z3251-8-29-47-3
[examples_device_api] sensor index: 0, Sensor ID: Z3251-8-29-47-3
[examples_device_api] current shutter speed: 30 (exposure time = 5.000)
[examples_device_api] sensor data at SS = 30
1493.00, 585.40, 579.70, 590.40, 587.00, 591.80, 587.00, 585.70, 583.40, 582.90, 585.90, 587.00, 597.70, 596.00, 577.60,
587.00, 600.30, 598.50, 588.50, 603.40, 594.60, 596.50, 598.80, 589.20, 576.30, 575.80, 593.30, 593.40, 588.20, 575.90,
579.60, 1613.50, 488.10, 589.30, 566.80, 580.90, 571.60, 577.30, 575.10, 574.10, 574.40, 570.80, 569.90, 583.70, 579.40,
588.70, 582.00, 599.30, 580.20, 583.20, 574.20, 585.00, 579.30, 585.80, 578.60, 566.20, 578.90, 577.70, 578.20, 591.20,
578.20, 581.60, 569.30, 580.80, 492.40, 577.20, 591.20, 578.20, 577.70, 577.00, 567.60, 577.10, 567.20, 576.40, 587.40,
587.00, 573.20, 591.80, 569.40, 596.80, 584.00, 584.50, 582.00, 585.20, 586.40, 578.30, 572.40, 580.20, 574.10, 567.00,
585.00, 589.40, 584.40, 583.40, 568.20, 572.20, 496.30, 747.80, 864.90, 1632.10, 841.60, 824.70, 819.20, 819.00, 842.00,
847.60, 856.80, 847.50, 847.70, 862.80, 861.00, 907.00, 905.50, 888.60, 906.40, 901.30, 907.40, 930.30, 923.50, 958.20,
```

After example running is done, you can find below result data such as 'examples_device_api_Z3251-8-29-47-3_result.csv' on ./nanoLambda/NSP32_SDK/examples/macOS/examples_device_api/dist/Debug/GNU-MacOSX



Installation and setup of Prism GUI application

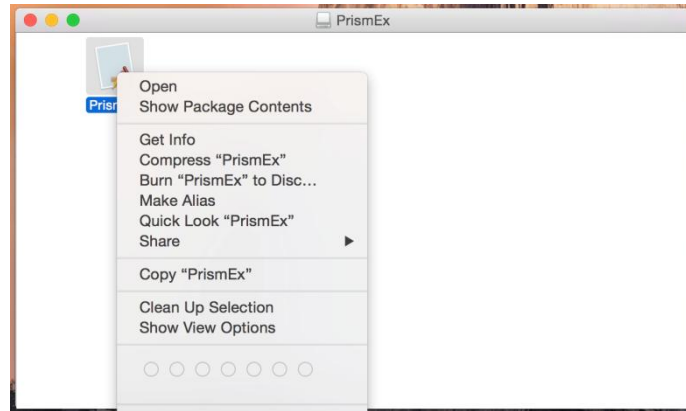
Installation of Prism application

'PrismEx' is default GUI application that is provided by nanoLambda. You can use this PrismEx for testing your NSP32 sensor if you have ADK from nanoLambda. For more information of 'PrismEx', please read '*Prism GUI User Manual.pdf*'.

Open 'PrismEx.dmg' from below path, and you might copy 'PrismEx' to your local folder.

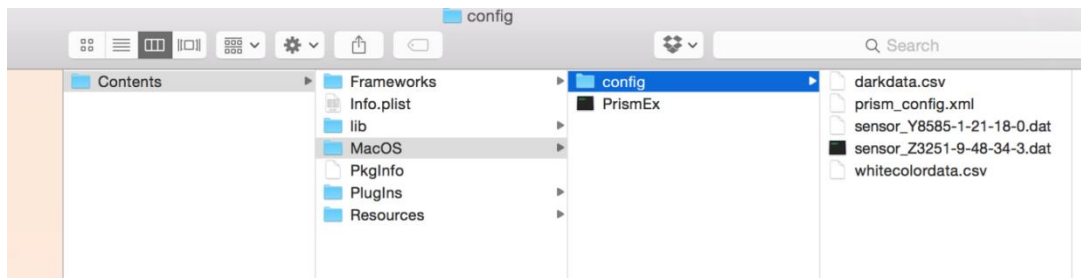
```
./nanoLambda/NSP32_SDK/prism_gui
```

Open the contents of 'PrismEx.dmg' using '*Show Package Contents*' menu



Copy sensor data to config folder

[IMPORTANT] Copy NSP32 sensor data ('sensor_Zxxxx-x-x-x-x.dat') to 'config' folder



Run Prism Application

After above installation procedure is done, you can run 'PrismEx' and you might see below screen.

For detail information of 'PrismEx', please read '*Prism GUI User Manual.pdf*'

