

Explore the next sense



Getting Started Guide Acconeer XC111-XR111 & XC112-XR112 Radar Sensor Evaluation Kit

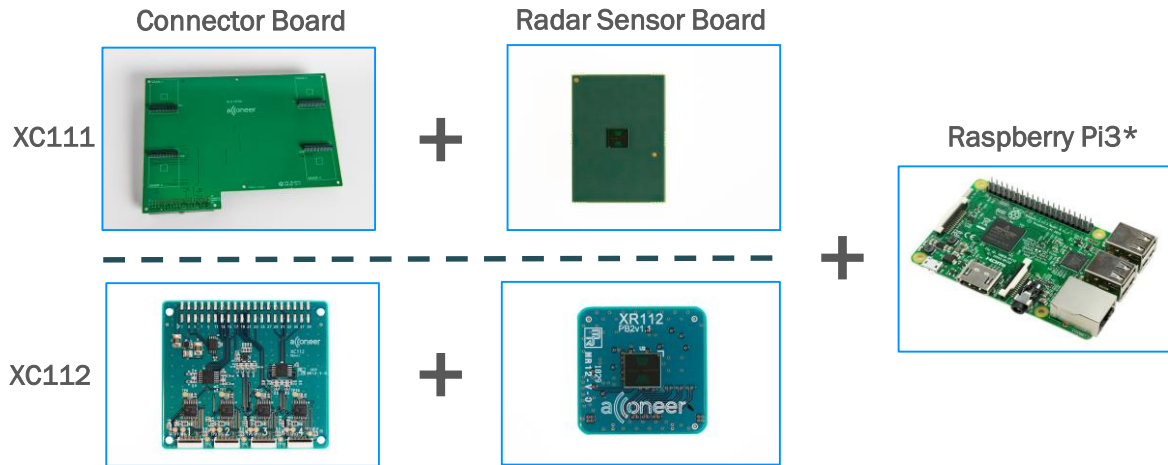
Oct 2018

Installation guide

This is an installation quick guide for the Acconeer XC111-XR111 and XC112-XR112 Radar Sensor Evaluation Kit (EVK). For a hands-on instruction video, please visit https://youtu.be/OuKrm_RAV_c.

Preparing the HW Installation

To complete a successful installation of Aconeer EVK, the following HW components will be required:



Additionally*:

- SD Card
- SD Card Holder
- USB Keyboard
- USB Mouse
- Flex Cable, 1 per XR112
- Power Supply for Raspberry Pi**
- Monitor with HDMI cable

* Not provided by Aconeer except flex cable

** Raspberry Pi original Power Supply is recommended

Preparing the SW installation

The following applications will be required to complete an installation. Also, they will be very useful when working with the Radar Sensor EVK. Please download and install:

- Acconeer SW for EVK: Available from <http://developer.acconeer.com>

For all users (Windows, Linux, IOS)

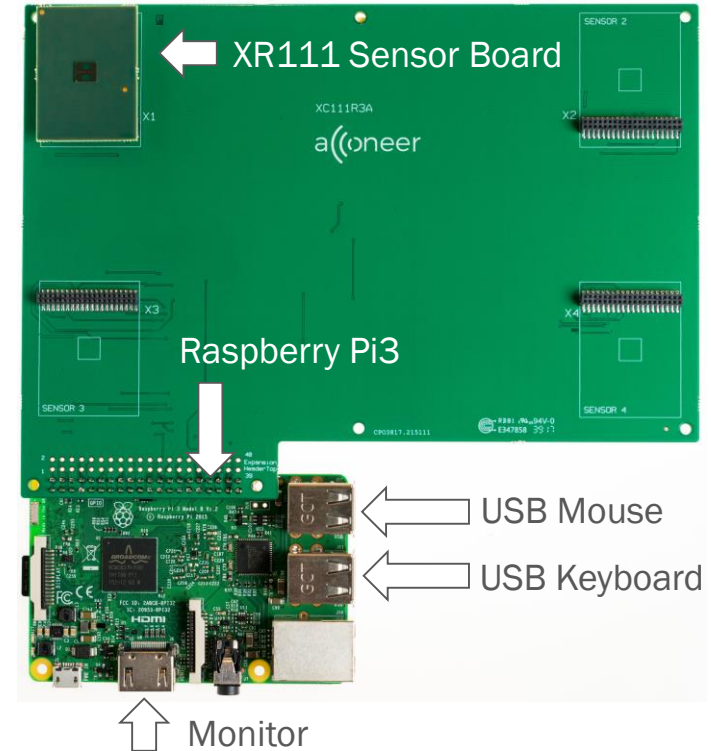
- Raspbian OS: Available from www.raspberrypi.org
- Etcher: Available from www.etcher.io for flashing the Raspbian OS

For Windows users (Linux/IOS users use SSH and SCP)

- PuTTY: Available from www.putty.org used for connecting to the Raspberry Pi
- WinSCP: Available from www.winscp.net used for transferring files to Raspberry Pi

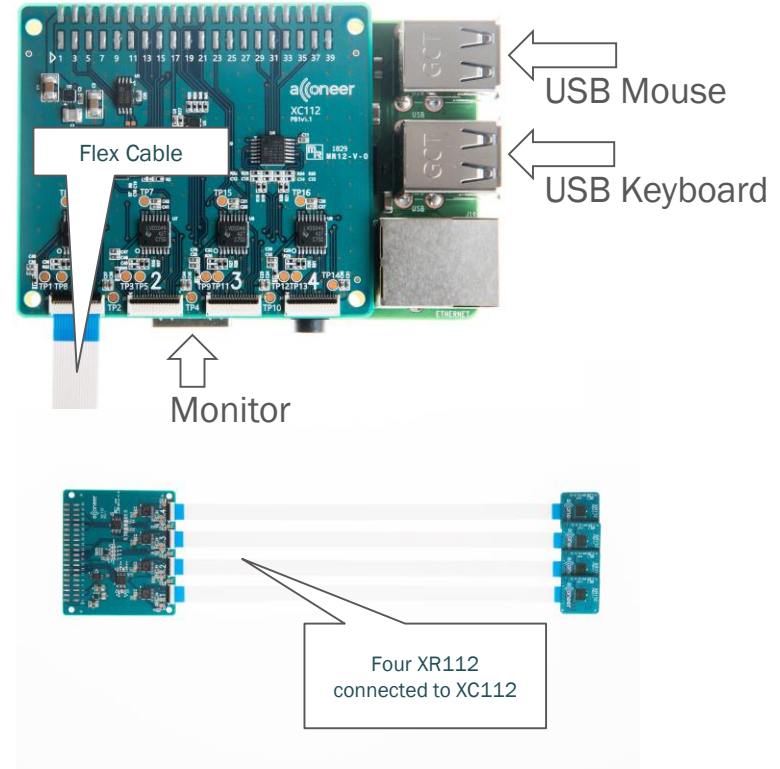
Assemble the HW XC111/XR111

- Connect the XR111 Radar Sensor Board to the XC111 Connector Board.
- Connect the Raspberry Pi3 to the XC111 Connector Board.
- The end result is illustrated in the picture to the right.
- Also, connect mouse and keyboard as illustrated.



Assemble the HW XC112/XR112

- Connect the XR112 Radar Sensor Board to the XC112 Connector Board using the provided flex cable.
- Connect the Raspberry Pi3 to the XC112 Connector Board.
- Also, connect mouse and keyboard in the same way as on previous page.



Installing the Raspbian

1. Insert the SD-Card in the PC. When prompted to format the card, please ignore/cancel.
2. Open Etcher.
3. Drag the Raspbian flash image, zipped, to Etcher.
4. Make sure the SD card is the selected destination.
5. Click flash. Flashing will begin and take a few minutes. When flashing is done, Etcher can be closed.



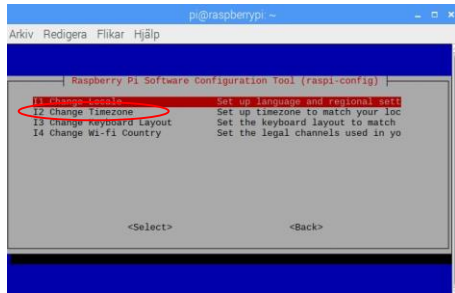
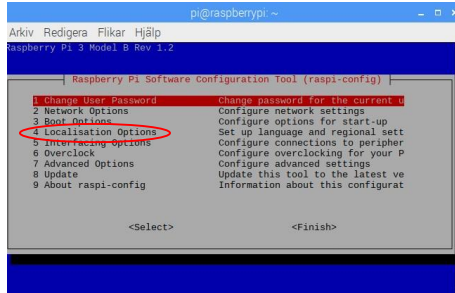
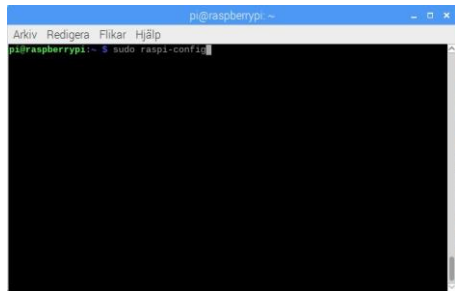
Depending on the security settings in Windows, you may need to click Yes in the confirmation popup to grant permission for the flashing process.

Installing Raspbian, cont.

1. Pull the SD card from the PC.
2. Insert into the Raspberry Pi.
3. Plug in the monitor, using the HDMI cable.
4. Plug in the power supply to the Raspberry Pi.
5. Boot of the Raspberry Pi will initiate automatically.

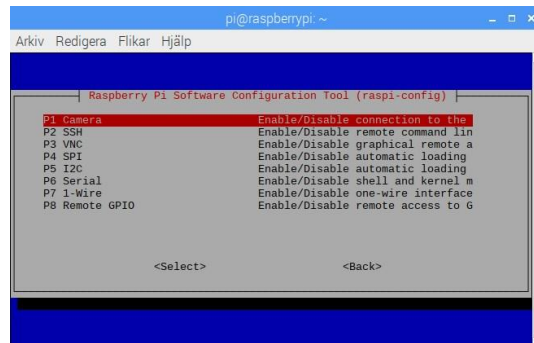
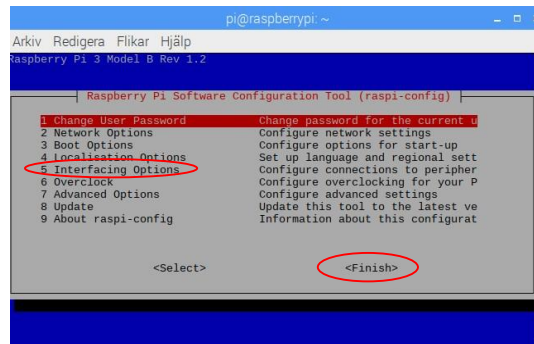
Installing the EVK

- Once booting is complete, you can start up the Raspberry Pi Terminal Window.
 - On the prompt, type `sudo raspi-config`. The configuration menu will appear.
-
- From the menu, choose #4 Localization options.
 - From the next menu choose #2 Change Time zone.
 - Set the appropriate Time zone.



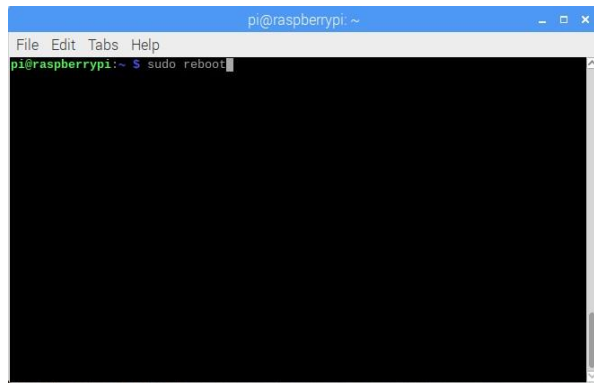
Installing Raspbian, cont.

- Go to #5 Interfacing options.
- Enable the following interfaces:
 - P2 SSH
 - P4 SPI
 - P5 I2C
- When done, click <finish> to close the config menu.

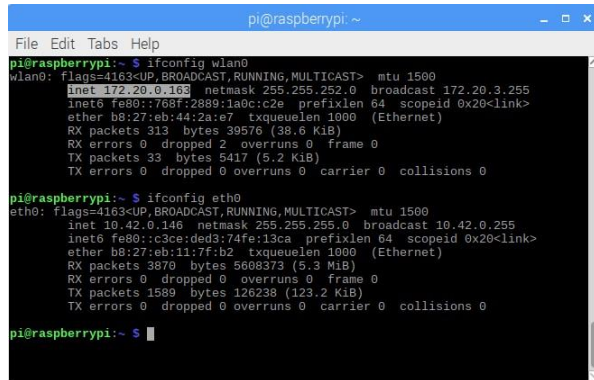


Installing Raspbian, cont.

- Once the command prompt appears, the installation is complete.
- To reboot the Raspberry Pi, type *sudo reboot* in the console.
- Once the reboot has been done, open the terminal window again. Now we need to find the Raspberry Pi IP address.
 - Type *ifconfig wlan0* - the IP address will appear in the terminal window.
 - If you do not use a wifi but have your raspberry connected by means of an Ethernet cable, type *ifconfig eth0*.
- In both cases, the Raspberry IP is visible as inet XXX.XX.X.XXX



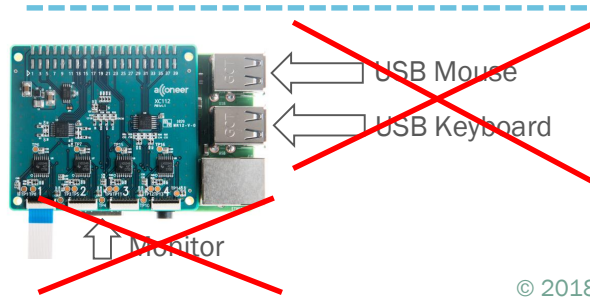
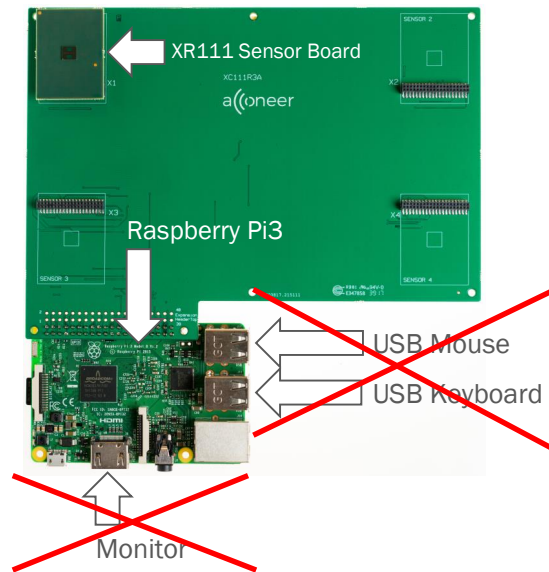
```
pi@raspberrypi:~  
pi@raspberrypi:~$ sudo reboot
```



```
pi@raspberrypi:~$ ifconfig wlan0  
wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 172.20.0.168 netmask 255.255.252.0 broadcast 172.20.3.255  
    inet6 fe80::768f:2889:1a0c:c2e prefixlen 64 scopeid 0x20<link>  
    ether b8:27:eb:44:2a:e7 txqueuelen 1000 (Ethernet)  
    RX packets 313 bytes 39576 (38.6 KiB)  
    RX errors 0 dropped 2 overruns 0 frame 0  
    TX packets 33 bytes 5417 (5.2 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
pi@raspberrypi:~$ ifconfig eth0  
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 10.42.0.146 netmask 255.255.255.0 broadcast 10.42.0.255  
    inet6 fe80::c3cedd9:74fe:13ca prefixlen 64 scopeid 0x20<link>  
    ether b8:27:eb:11:7f:b2 txqueuelen 1000 (Ethernet)  
    RX packets 3870 bytes 5608373 (5.3 MiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 1589 bytes 126238 (123.2 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
pi@raspberrypi:~$
```

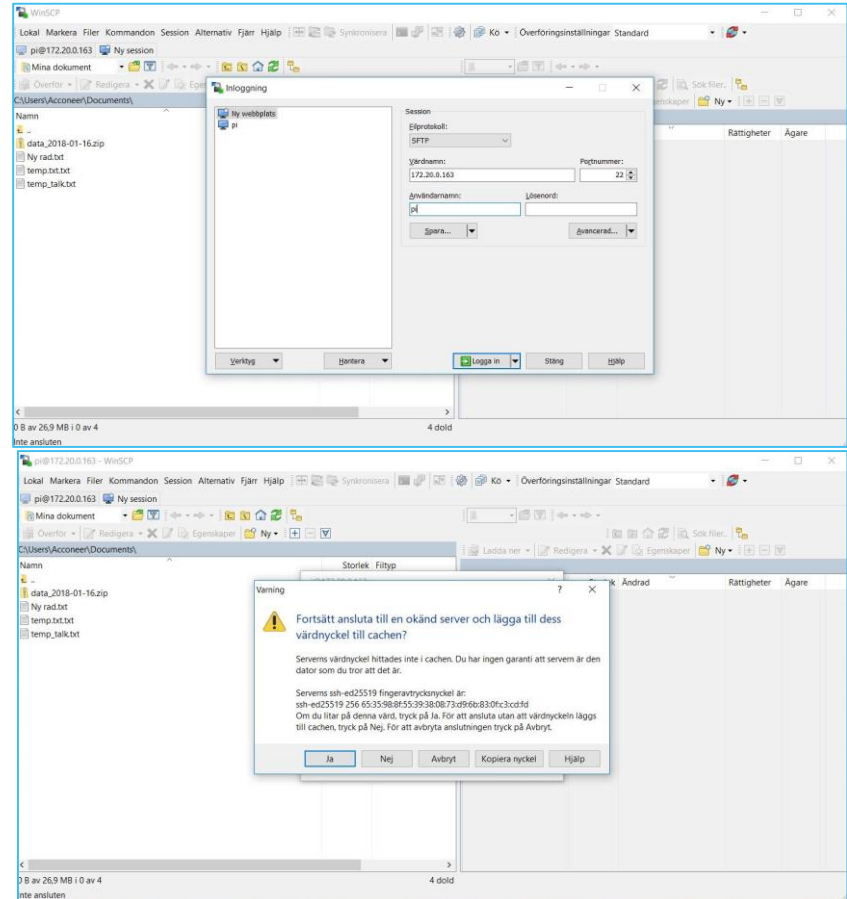
Installing Raspbian, cont.

- If everything is completed up to this point, you could disconnect both mouse and keyboard, as you now can control the setup remotely.
- Now let us continue by installing the Acconeer SW.



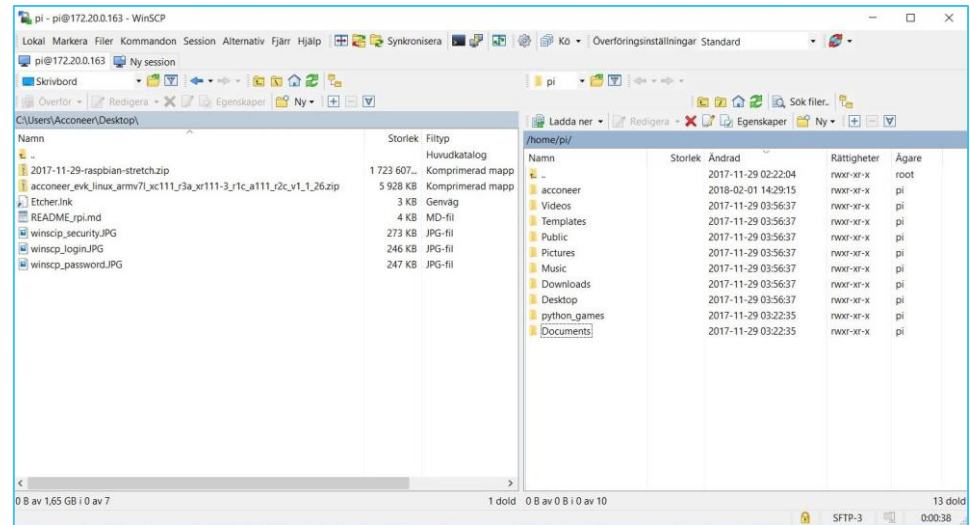
Installing the EVK SW

- Open up WinSCP.
- For Host name, enter the IP address retrieved from the Raspberry Pi.
- The Port should remain as default: 22
- Username and password are by default:
 - Username: pi
 - Password: raspberry
- Click Login.
- If you receive a Warning, simply click Yes or Update.



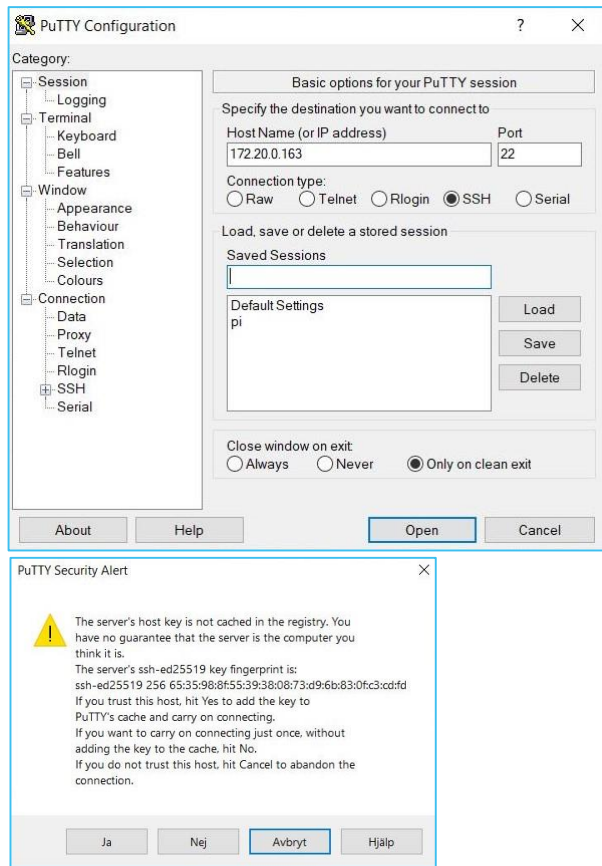
Installing the EVK Software

- Once logged in, you can see your local PC to the left and the Raspberry to the right.
- Locate the Acconeer SW zip on your local computer.
- Drag the file to the raspberry and release it in the /home/pi/ folder, as shown in the picture.



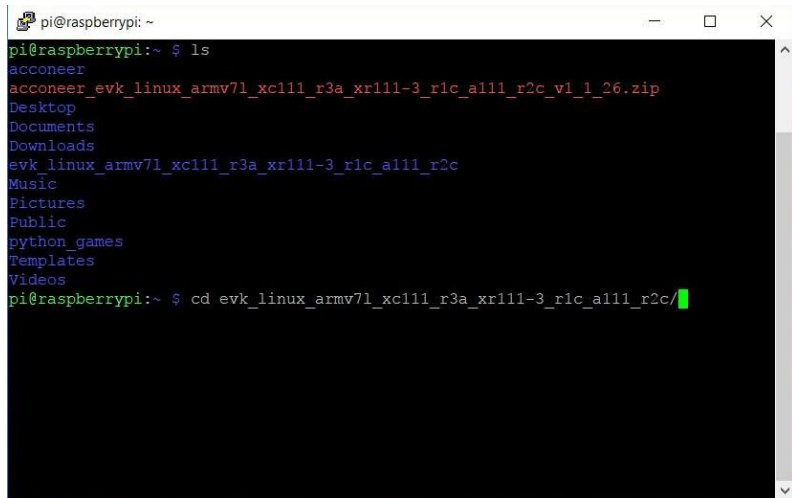
Installing the EVK Software

- Now open PuTTY.
- Enter the same IP address as previously and click Open.
- If prompted by a Warning, click Yes.



Installation the EVK Software

- A terminal window opens and you can login with the user name *pi* and password *raspberrypi*.
- The command *ls* will give you a list of all files/folders in the root of the raspberry.
- To unzip the Acconeer SW, type *sudo unzip [filename]*
- Once unzipped, you can enter the SW directory by using *sudo cd EVK....*



```
pi@raspberrypi: ~  
pi@raspberrypi:~ $ ls  
aconeer  
aconeer_evk_linux_armv7l_xc111_r3a_xr111-3_r1c_a111_r2c_v1_1_26.zip  
Desktop  
Documents  
Downloads  
evk_linux_armv7l_xc111_r3a_xr111-3_r1c_a111_r2c  
Music  
Pictures  
Public  
python_games  
Templates  
Videos  
pi@raspberrypi:~ $ cd evk_linux_armv7l_xc111_r3a_xr111-3_r1c_a111_r2c/
```

Installation the EVK Software

- From within the directory, you can activate different services.
- The illustration below shows activation of the distance detector:
`./out/example_detector_distance_rpi_xc111_r3a_xr111-3_r1c_a111_r2c*`

```
pi@raspberrypi: ~/evk_linux_armv7l_xc111_r3a_xr111-3_r1c_a111_r2c
pi@raspberrypi:~/evk_linux_armv7l_xc111_r3a_xr111-3_r1c_a111_r2c $ ./out/example_detector_distance_rpi_xc111_r3a_xr111-3_r1c_a111_r2c
18:37:28.062 [17716] (I) (example_detector_distance): Aconeer software version v1.1.26
18:37:28.434 [17717] (I) (message_router): Loaded internal driver (dummy)
18:37:28.437 [17716] (I) (aconeer): acc_start() Detected 4 sensor(s)
18:37:28.437 [17788] (I) (request_sensor_preparation): Performing sensor preparation, sensor 1
18:37:28.519 [17788] (I) (core_all1_r2c): Margin test status (99, 99, 100, 84)
18:37:28.566 [17788] (I) (acc_alg_dly_coarse_selection): Dly_coarse calibration status: 5 5 5
18:37:28.653 [17788] (I) (acc_alg_rx_fine_dip_selection): Rx_fine_dip calibration status: 45
18:37:28.842 [17788] (I) (acc_alg_area_selection): selected_area_index=2
18:37:28.937 [17788] (I) (core_all1_r2c): Offset calibration status: 10605
18:37:28.938 [17788] (I) (request_sensor
```

Installation EVK SW

- The picture to the right shows how to start the envelope:
`./out/example_envelope_rpi_xc111_r3a_xr111-3_r1c_a111_r2c*`

*Please note that the path name might change slightly depending on SW version and HW variant.

```
pi@raspberrypi: ~/evk_linux_armv7l_xc111_r3a_xr111-3_r1c_a111_r2c
pi@raspberrypi:~/evk_linux_armv7l_xc111_r3a_xr111-3_r1c_a111_r2c$ ./out/example_envelope_rpi_xc111_r3a_xr111-3_r1c_a111_r2c
18:38:25.669 [17852] (I) (example_envelope): Aconeer software version v1.1.26
18:38:26.082 [17853] (I) (message_router): Loaded internal driver (dummy)
18:38:26.085 [17852] (I) (aconeer): acc_start() Detected 4 sensor(s)
18:38:26.086 [17924] (I) (request_sensor_preparation): Performing sensor preparation, sensor 1
18:38:26.167 [17924] (I) (core_a111_r2c): Margin test status (100, 100, 100, 81)
18:38:26.214 [17924] (I) (acc_alg_dly_coarse_selection): Dly coarse calibration status: 5 5 5
18:38:26.
```

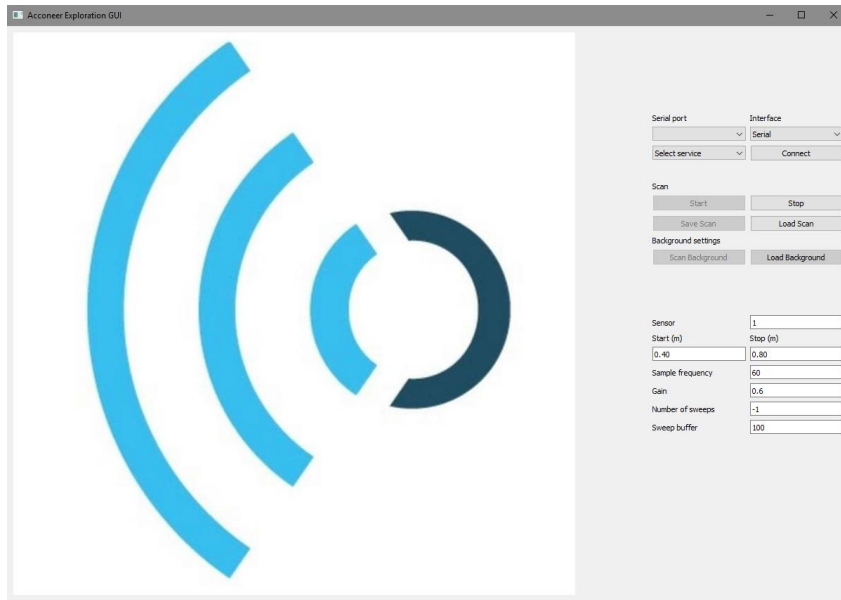
Exploration Tool

Acconeer has developed a tool that let the user view the data from our service and detectors.

The tool can be downloaded from:

<https://github.com/acconeer/acconeer-python-exploration>

There you will also find an Installation guide and support.



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