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

July 2018

Installation guide

This is an installation quick guide for the Acconeer XC111-XR111 and XC112-XR112 Radar Sensor Evaluation Kit (The EVK). For a hands-on instruction video, please visit https://youtu.be/0uKrm_RAV_c.

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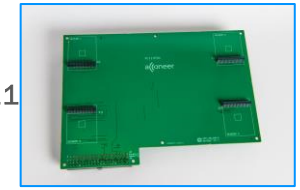
Preparing the HW Installation

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

Connector Board

Radar Sensor Board

XC111



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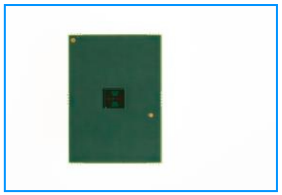
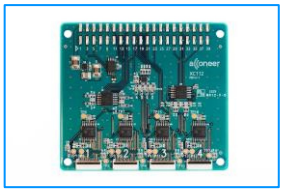


XC112



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Raspberry Pi3*

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 Acconeer except flex cable
** Raspberry Pi original Power Supply is recommended

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Preparing the SW installation

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

- Acconeer SW for EVK: Available from https://www.acconeer.com/products

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

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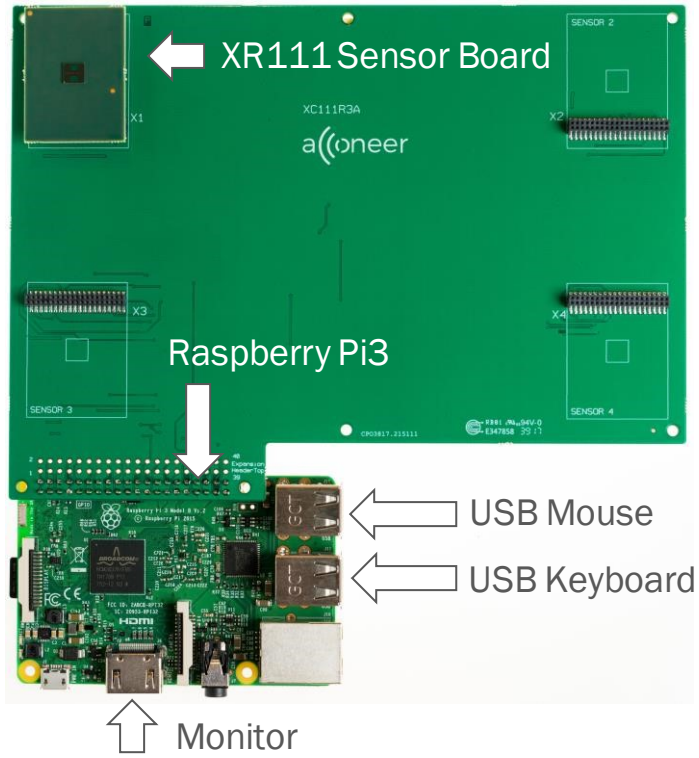
Assemble the HW XC111/XR111

- 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 here
- Also, connect mouse and keyboard as illustrated



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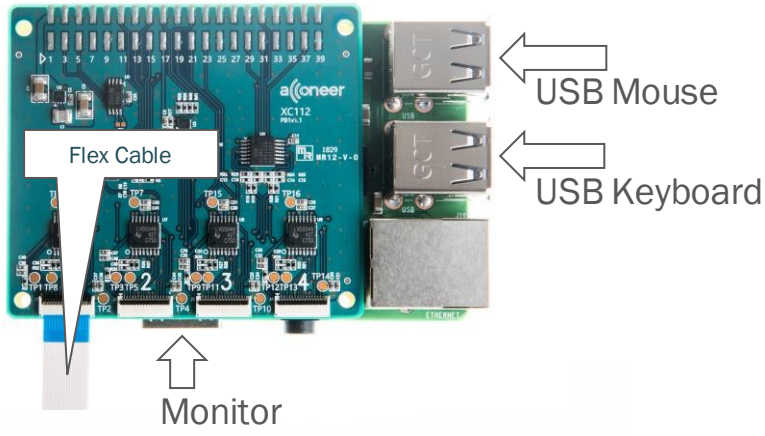
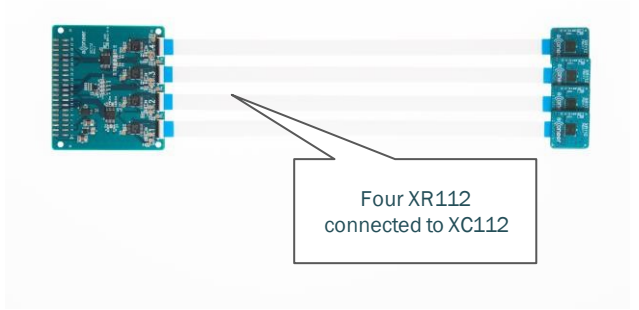
Assemble the HW XC112/XR112

- 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





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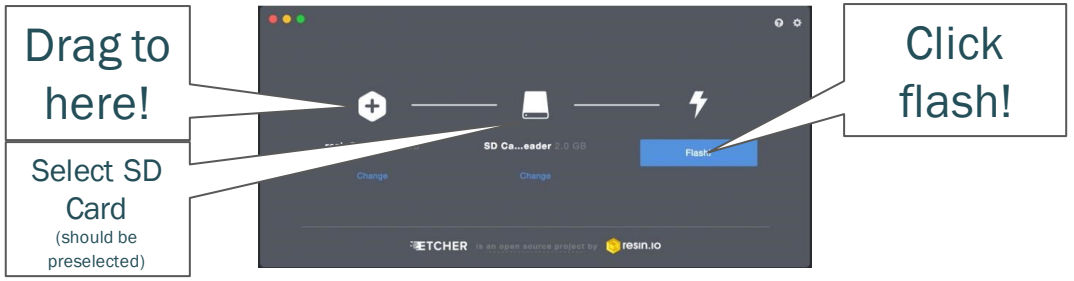
Installing the Raspbian

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.

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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.

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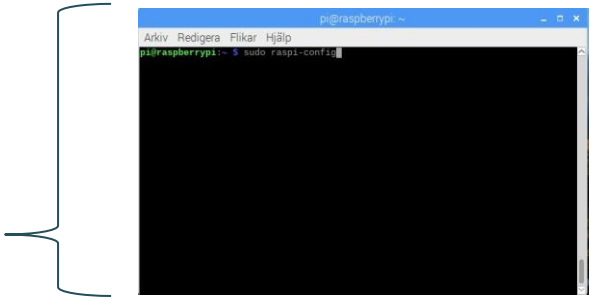
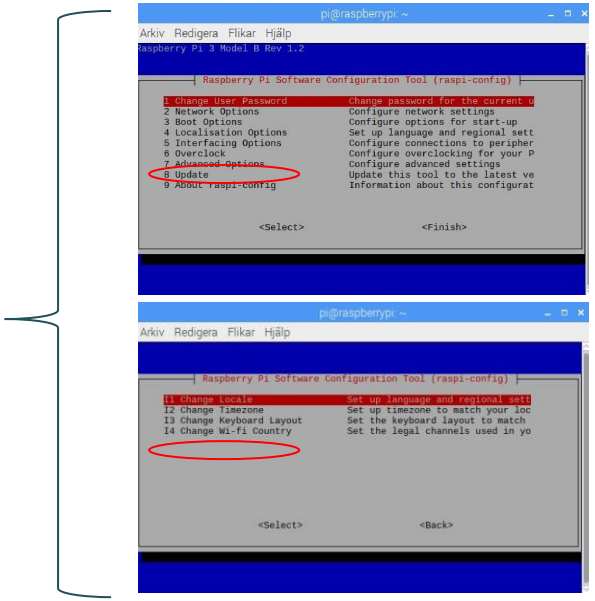
Installing the EVK

- 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
- And from the next menu; #2 Change Time zone
- Set the appropriate Time zone



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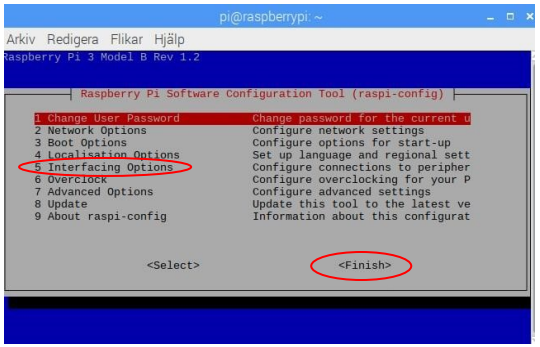
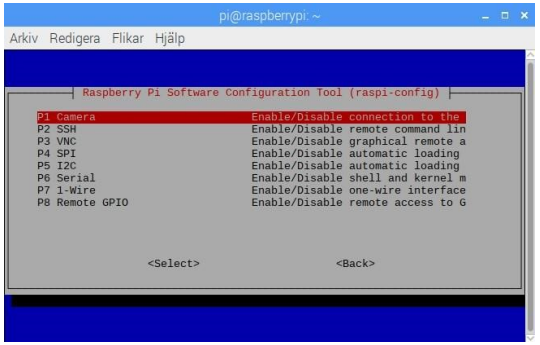
Installing Raspbian, cont.

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





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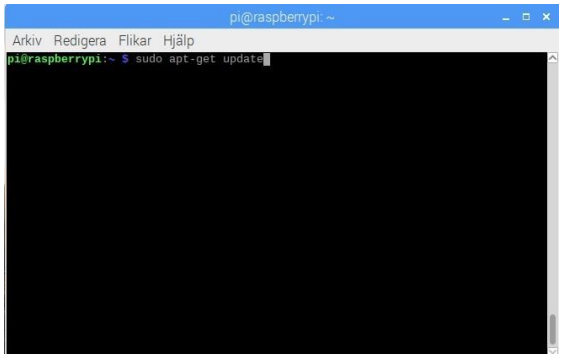
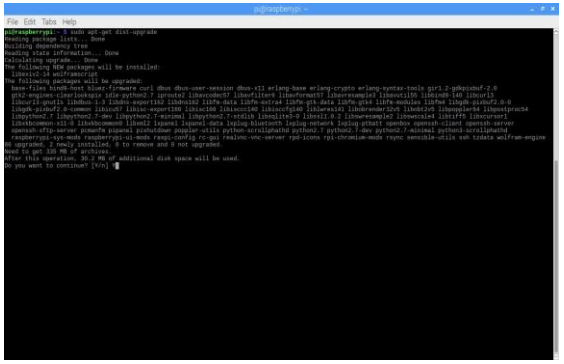
Installing Raspbian, cont.

- Make sure your PC and Raspberry Pi is connected to wifi. If that is not an option, use an Ethernet cable to connect your PC to the Raspberry Pi
- To make sure that you are using the latest version of Raspbian, type *sudo apt-get update*. This command will present the latest update
- Type *sudo apt-get dist-upgrade* to start the upgrade and confirm, when prompted, with a Y





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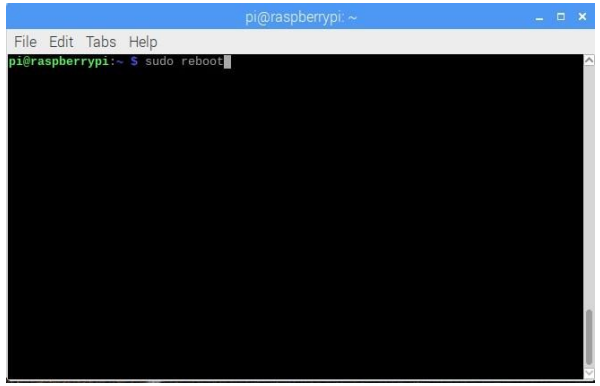
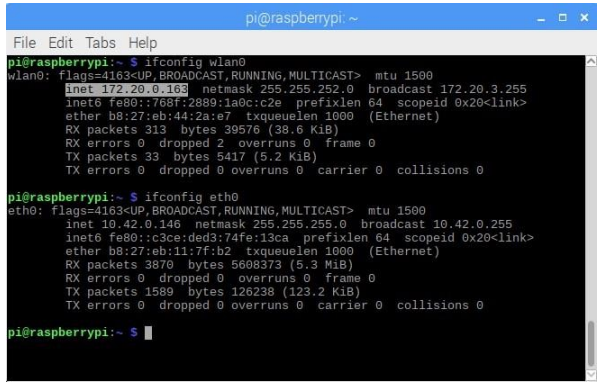
Installing Raspbian, cont.

- 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 adress.
  - Type *ifconfig wlan0* - the IP adress 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





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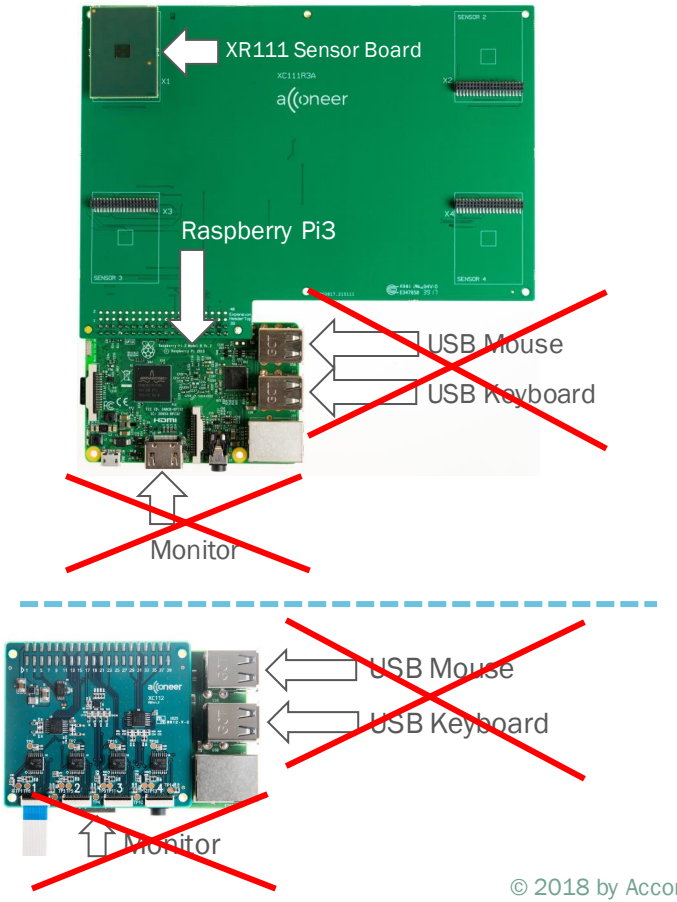
Installing Raspbian, cont.

- 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.



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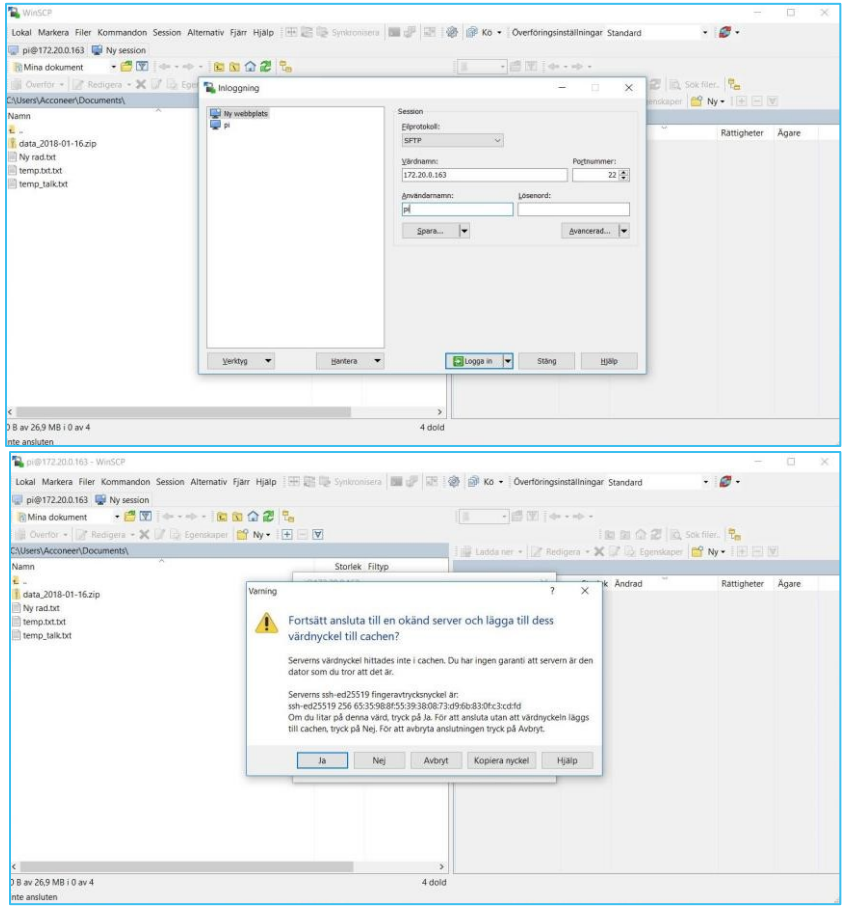
Installing the EVK SW

- 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.



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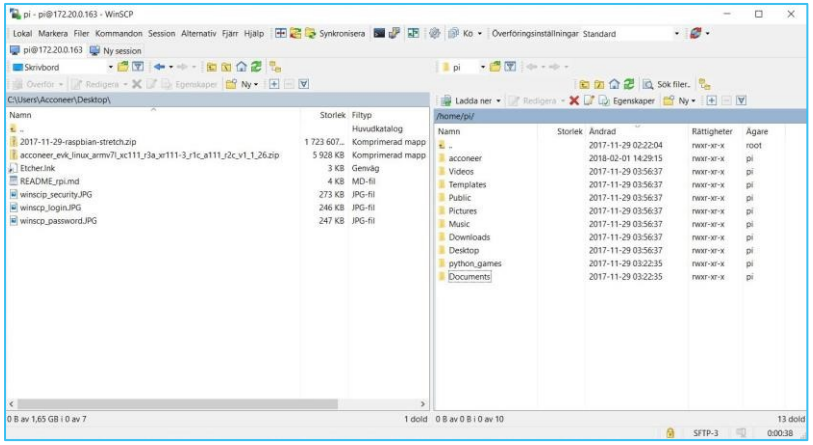
Installing the EVK Software

- 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 root.



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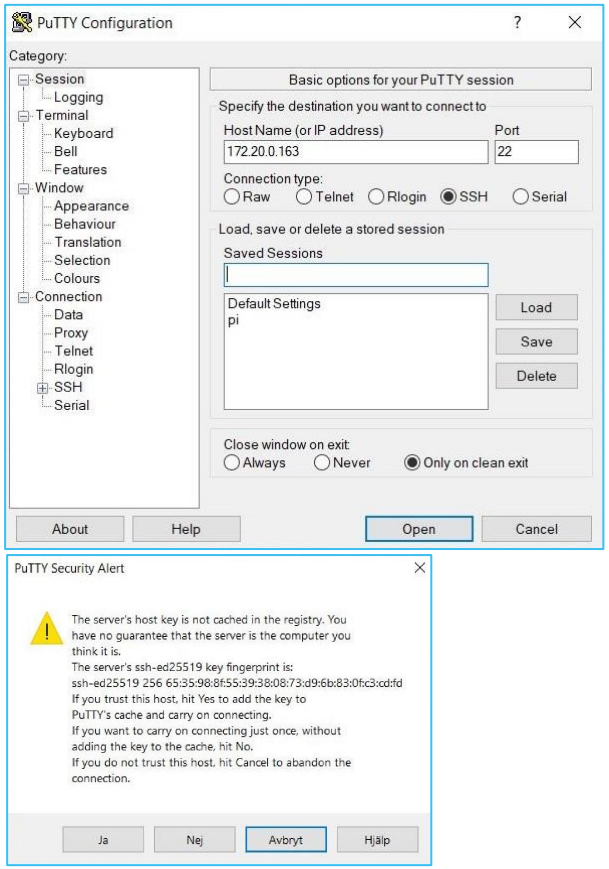
Installing the EVK Software

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



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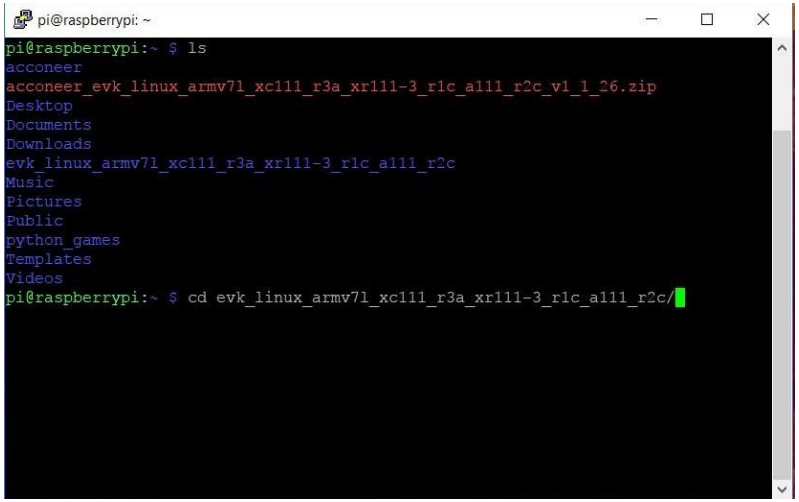
Installation the EVK Software

- A terminal window opens and you can login with the user name pi and password raspberry.
- 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*….



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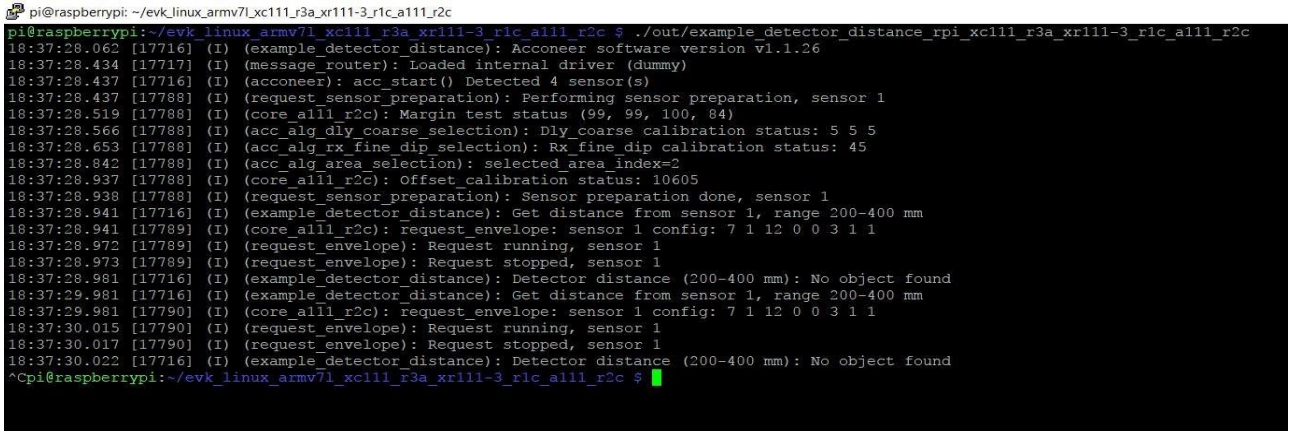
Installation the EVK Software

- 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*



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

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Installation EVK SW

- The picture on the right-hand side 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): Acconeer software version v1.1.26
18:38:26.082 [17853] (I) (message_router): Loaded internal driver (dummy)
18:38:26.085 [17852] (I) (acconeer): 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
18:38:26.301 [17924] (I) (acc_alg_rx_fine_dip_selection): Rx_fine_dip calibration status: 45
18:38:26.490 [17924] (I) (acc_alg_area_selection): selected_area_index=1
18:38:26.585 [17924] (I) (core_a111_r2c): Offset_calibration status: 10451
18:38:26.585 [17924] (I) (request_sensor_preparation): Sensor preparation done, sensor 1
18:38:26.589 [17852] (I) (example_envelope): Get envelope from sensor 1
18:38:26.589 [17925] (I) (core_a111_r2c): request_envelope: sensor 1 config: 7 1 12 0 0 3 1 1
18:38:26.620 [17925] (I) (request_envelope): Request running, sensor 1
18:38:26.621 [17925] (I) (request_envelope): Request stopped, sensor 1
18:38:26.629 [17852] (I) (example_envelope): Actual start range: 60 mm
18:38:26.629 [17852] (I) (example_envelope): Actual end range: 400 mm
        815         911        1009        1108        1206        1303        1397        1488
       1574        1655        1732        1802        1868        1928        1982        2032
       2076        2116        2151        2183        2211        2236        2258        2278
       2296        2312        2327        2340        2353        2365        2377        2387
       2397        2406        2415        2422        2427        2431        2432        2431
       2428        2421        2412        2400        2384        2366        2345        2321
       2294        2265        2234        2202        2167        2132        2096        2059
       2021        1983        1944        1906        1867        1828        1789        1750
       1710        1671        1632        1593        1554        1515        1476        1438
       1399        1361        1322        1284        1247        1209        1172        1136
       1100        1064        1029         994         960         927         894         861
        830         798         768         738         708         680         651         624
        597         570         544         518         493         469         445         421
        399         377         356         335         316         297         280         264
        249         236         224         214         205         197         191         187
        184         182         181         181         182         184         186         188
        190         193         195         196         198         198         198         198
        196         194         191         187         182         177         171         164
        157         149         141         133         125         117         110         103
         97          92          88          85          83          82          82          83
         85          89          93          98         104         111         118         126
        134         142         151         159         168         177         186         195
        204         213         221         229         237         245         252         258
        265         270         275         280         283         287         289         291
        292         293         293         292         291         289         286         282
        278         274         269         263         257         251         244         237
        230         222         215         208         201         194         187         181
        175         169         164         160         156         153         150         148
        146         145         144         144         145         145         146         147
        149         151         153         155         157         159         162         164
        166         169         171         173         175         176         178         178
        179         179         178         177         175         172         169         165
        161         156         151         145         140         135         129         125
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