Explore the next sense

Getting Started Guide Lens Evaluation Kit LH112/122/132

November 2020

Getting Started Guide

The Lenses are delivered as kits with two different lenses, a cover and a holder. The holder comes in three versions LH112 used for XR112 and XM112, LH122 used for XM122 and finally LH132 used for XE132. This getting started guide will show you how to setup the lens evaluation kit.

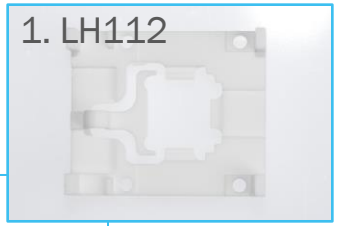
We assume that you already have a sensor evaluation kit (EVK) XC/XR112, or a module EVK XB/XM112, XB/XM122 or XE132 and that you are familiar with how to use it.

Acconeer reference lenses are made of Polyamide PA12. They are solid.

Kit content

The Lens Kit from Acconeer is delivered including 4 parts.

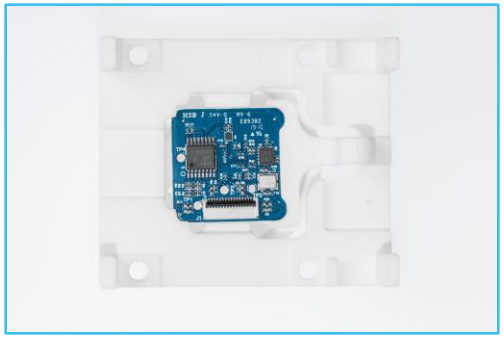
1. Lens and PCB holder
2. HBL Lens (Hyperbolic Lens)
3. FZP Lens (Fresnel Zone Plate)
4. Flat cover



Acconeer apologize for our choice of White on White.

How to Assemble LH112

XR112 in the holder

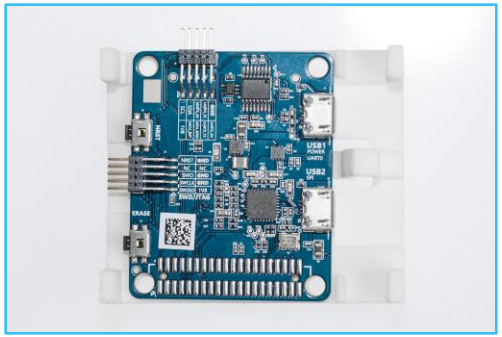


First thing you need to do is to fit the PCB into the Holder, which can be used with Both XR112 (To the left) and Acconeers XB/XM112 (To the right). If using XB/XM112 we recommend to also screw the PCB to the holder. The exact sensor position in relation to the lens will be important for optimal performance.

Link to Screw and Bolt:
https://www.digikey.com/product-detail/en/b-f-fastener-supply/NY-PMS-632-0050-PH/H560-ND/46293

https://www.digikey.com/products/en?keywords=HN-6-32-01

XM112 in the holder



How to Assemble LH122

XM122 in the holder

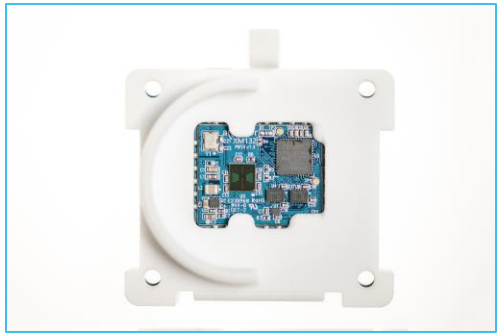
First thing you need to do is to fit the PCB into the Holder. After XM122 is securely fitted you can easily connect it to your XB122 breakout board if needed. *Be careful not try to fit the holder to XM122 when it is connected to the XB card. The connector is sensitive and can break.*
The exact sensor position in relation to the lens will be important for optimal performance.

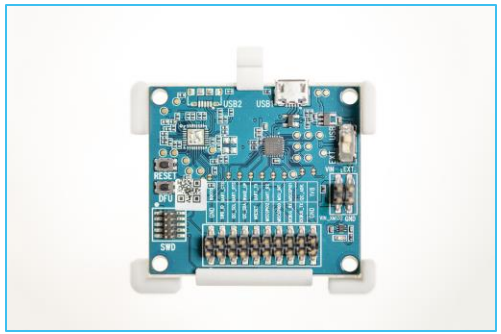
To the right is an example how to NOT place the sensor. Ensure that the BT antenna always is placed in the gap of the holder to ensure best performance.

XM122 suboptimal placement

How to Assemble LH132

XE132 in the holder





First thing you need to do is to fit the PCB into the Holder. (To the left)
We recommend to screw the PCB to the holder. The exact sensor position in relation to the lens will be important for optimal performance.
The PCB only fits one way into the holder without obstructing the USB.

Distance from PCB to Lens for LH112 /122 /132

D2

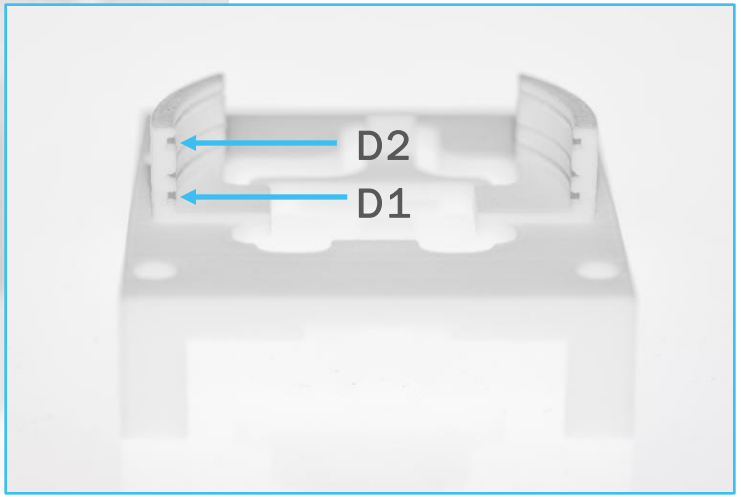
D1

	LH112						LH122			LH132		
	XR112			XM112			XM122			XE132		
	FZP	HBL	Cover	FZP	HBL	Cover	FZP	HBL	Cover	FZP	HBL	Cover
D1[mm]	3	3	5.1	3.3	3.3	5.4	3	3	5	3	3	5
D2[mm]	8.2	8.2	N/A	8.5	8.5	N/A	8.2	8.2	N/A	8.2	8.2	N/A

Both the lenses can be fitted in the holder in two different positions. D1 or D2. The positioning numbering is identical for all three lens kits.

The cover (see page 3) is only used in D1.

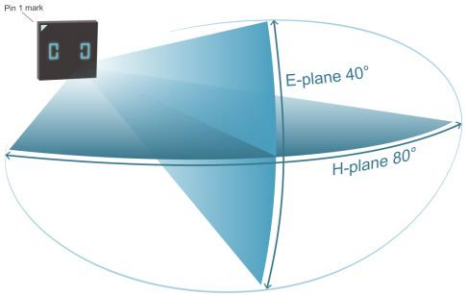
The two positions will give you slightly different performance. See next 3 pages



Performance Table LH112

Acconeer has verified both the lenses on both EVK variants. The expected performance can be viewed in the table to the right.

- Max. Gain relative to free space. This is Radar loop gain, the sum of the gain back and forth
- Half Power Beam width E-plane
- Half Power Beam width H-plane



XM112 with LH112 holder	Max. Gain (dB_{FS})*		HPBW-E (degree)**		HPBW-H (degree)**	
	D1	D2	D1	D2	D1	D2
HBL	11.6	20	22	17	30	15
FZP	11.4	18.2	20	12	27	12

XR112 with LH112 holder	Max. Gain (dB_{FS})*		HPBW-E (degree)		HPBW-H (degree)	
	D1	D2	D1	D2	D1	D2
HBL	10.8	19	15	12	20	12
FZP	11.2	17	25	12	12	10

*Maximum gain is relative to the free-space scenario.

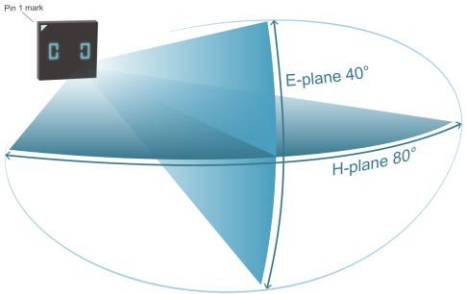
**Pre characterization results

Performance Table LH122

Acconeer has verified both the lenses on both EVK variants. The expected performance can be viewed in the table to the right.

- Max. Gain relative to free space. This is Radar loop gain, the sum of the gain back and forth
- Half Power Beam width E-plane
- Half Power Beam width H-plane

XM122 with LH122 holder	Max. Gain (dB_{FS})*		HPBW-E (degree)**		HPBW-H (degree)**	
	D1	D2	D1	D2	D1	D2
HBL	11.4	19	22	17	30	15
FZP	12	15.2	20	12	27	12



*Maximum gain is relative to the free-space scenario, pre characterization.

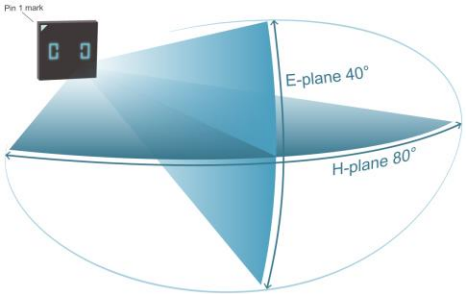
**Simulated results

Performance Table LH132

Acconeer has verified both the lenses on both EVK variants. The expected performance can be viewed in the table to the right.

- Max. Gain relative to free space. This is Radar loop gain, the sum of the gain back and forth
- Half Power Beam width E-plane
- Half Power Beam width H-plane

XE132 with LH132 holder	Max. Gain (dB_{FS})*		HPBW-E (degree)**		HPBW-H (degree)**	
	D1	D2	D1	D2	D1	D2
HBL	11.6	17.3	TBD	TBD	TBD	TBD
FZP	8.8	15.3	TBD	TBD	TBD	TBD

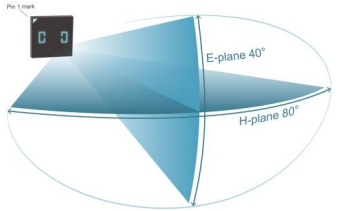


*Maximum gain is relative to the free-space scenario.

**Pre characterization results

Performance Table

LH112 holder	Max. Gain (dB_{FS})*		HPBW-E (degree)		HPBW-H(degree)	
	XM112	XR112	XM112	XR112	XM112	XR112
FS	0	0	55	40	80	63
Cover**	- 0.3	- 0.3	55	40	80	63



LH122 holder	Max. Gain (dB_{FS})*	HPBW-E (degree)***	HPBW-H(degree)***
	XM122	XM122	XM122
FS	0	55	80
Cover**	- 0.04	55	80

LH132 holder	Max. Gain (dB_{FS})*	HPBW-E (degree)***	HPBW-H(degree)***
	XE132	XE132	XE132
FS	0	TBD	TBD
Cover**	TBD	TBD	TBD

*Maximum gain is relative to the free-space scenario.
**Cover is only placed at D1.
***Simulated results

End Result LH112

HBL Lens in D1

XR112 used

The Correct Assembled Lens EVK should look like one of the examples in the pictures depending on chosen position.

FZP Lens in D1

XM/XB112 used

HBL Lens in D2

XR112 used

Cover, only in D1

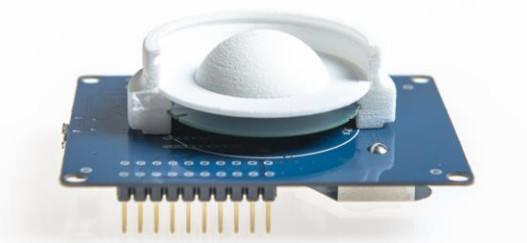
XM/XB112 used

FZP Lens in D2

XM/XB112 used

End Result LH122

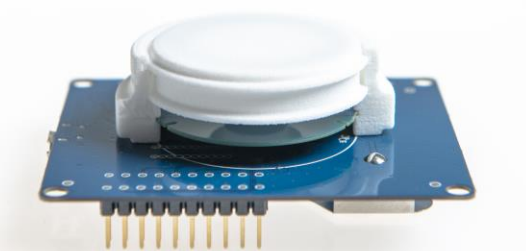
HBL Lens in D1



XM122 used

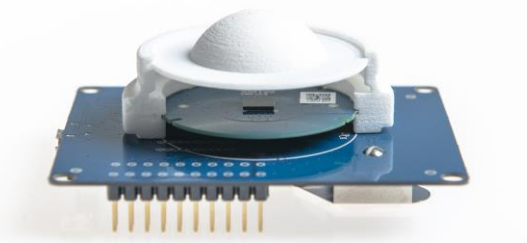
The Correct Assembled Lens EVK should look like one of the examples in the pictures depending on chosen position.

FZP Lens in D1



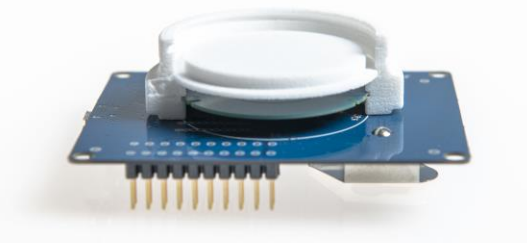
XM122 used

HBL Lens in D2



XM122 used

Cover, only in D1



XM122 used

End Result LH132

The Correct Assembled Lens EVK should look like one of the examples in the pictures depending on chosen position.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