Fobos One

Product Overview

Fobos One is a radio frequency acquisition and digital signal processing unit. It combines a wideband SDR receiver with a single-board computer , providing a system for radio frequency receiving, digitizing, and digital signal processing.



Standard package

- Fobos 4.0 SDR receiver
- Interfacing board
- Shielded housing

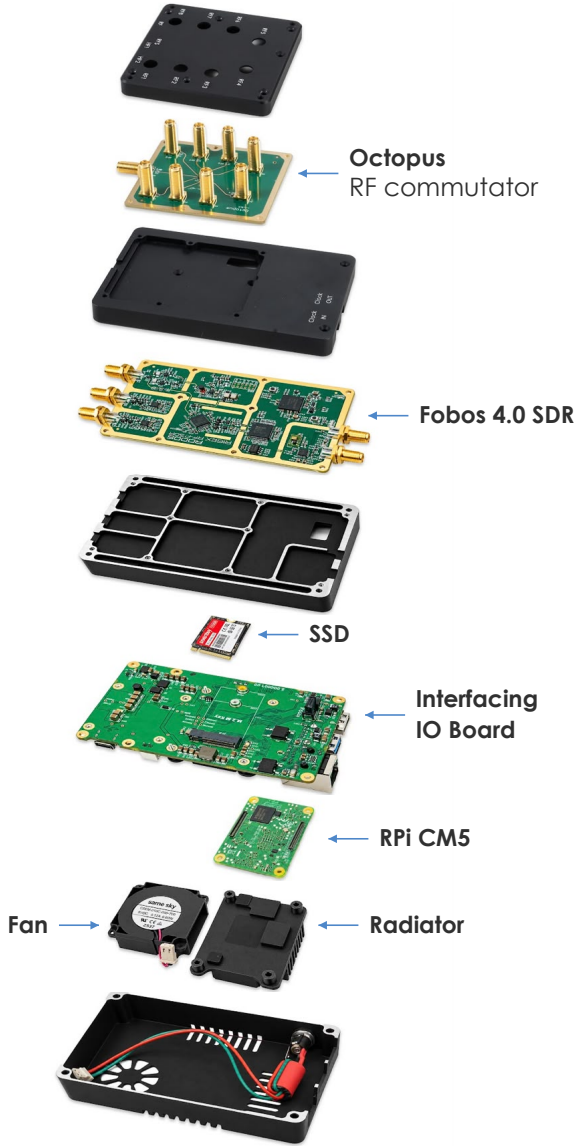
Additional components

- Raspberry Pi Compute Module 5 CM5016064*
- RigExpert®Octopus antenna switch
- Connection cable
- Modified housing
- M.2 NVMe SSD

Applications

- Spectrum analysis
- Radio emission detector
- Electromagnetic interference detection
- Networked SDR receiver
- Radio monitoring station
- Remote radio frequency sensor or distributed sensor network

Fobos One in full configuration



* The Raspberry Pi Compute Module 5 is not included in the base package. Its variant, RAM capacity, and onboard storage capacity may vary. The specific configuration is agreed upon when placing the order.

Features

- The Fobos 4.0 SDR receiver features an extended frequency range, higher sampling rate, better sensitivity, and faster scanning compared to the Fobos 3.0 version. Its core board also features a conformal coating that provides additional protection against moisture.
- The Raspberry Pi Compute Module 5 enables software to be developed, deployed, tested, and run directly on the Ubuntu operating environment.
- The high-speed 1 Gbit/s Ethernet interface allows remote control and processed data transmission to other systems and users.
- The HDMI port allows an external display to be connected, enabling the use of a graphical user interface.
- A SuperSpeed USB 3.0 host interface supports external peripherals.
- NVMe SSD support via an M.2 interface for high-speed local data storage.
- A robust, shielded housing minimizes the electromagnetic interference.
- Support for two power supply options (PoE or an external DC power source) allows the Fobos One to be used as a remote sensor within distributed radio monitoring and situational awareness systems.
- Compact design, light weight, and moderate power consumption allow the Fobos One to be mounted on mobile and moving platforms.

Performance Specifications

Parameter	Value
Power supply	- DC 12 V, 3 A - PoE: IEEE 802.3at compliant
Power consumption	Idle: 6 W Active: 13 W Max: 25 W
Interfaces: 1) Power	Ethernet PoE DC POWER JACK PJ-065A
2) Compute module connector	2 × 100-pin board-to-board mezzanine connectors, Amphenol 10164227-1001A1RLF
3) Antenna connections	SMA-F (RF, HF1, HF2)
4) Synchronization	SMA-F (Clock In, Clock Out)
5) External connectivity	1 Gbit/s Ethernet
6) Display connection	HDMI, DSIx2
7) Peripheral connectivity	USB 3.0
8) NVMe storage interface	M.2 M-Key socket, PCIe
Overall dimensions, max	114 × 72 × 41 mm
Operating temperature	−20…+60 °C
Weight, max	370 g

*The specifications are provided for a configuration with a Raspberry Pi Compute Module 5 (CM5) installed.

Fobos 4.0 SDR receiver specifications

Parameter	Value
Operation modes	- two-channel direct sampling - double conversion heterodyne
Frequency tuning range	- no tuning in direct sampling mode - 50..8800 MHz in heterodyne mode
Tuning resolution	<1 Hz
Frequency coverage	100 kHz ... 32 MHz (direct sampling mode) 25 MHz ... 8.825 GHz (heterodyne mode)
Synthesizer setting time, typ.	280 µs
Synthesizer phase noise, 6 GHz @10 kHz offset, typ.	-90 dBc/Hz
Gain control range	95 dB (heterodyne mode)
IQ sample rate / receive bandwidth	8–64 MS/s / up to 64 MHz (arbitrary values)
ADC resolution	14 bits
Blocking Dynamic Range	86 dB (direct sampling mode) 82 dB (heterodyne mode)
IQ Image rejection	56 dB (combined)
Adjacent channel rejection @16-64 MS/s, typ.	65 dB
Main RF Image rejection, typ.	60 dB
Maximum RF input	+10 dBm
Power source	3.8 - 5.5 V nominal
Current consumption	360 mA in idle state 510 mA in hot-start mode 580 mA in direct sampling mode 600 mA in full band operating mode
Clock source	- internal - external, selectable within API
External clock input	10 MHz, high impedance, 1 V p-p
Clock output	10 MHz, 50 Ohm, 3.0 V p-p, permanent
Internal clock reference phase noise, 10 MHz @10 kHz offset, typ.	-130 dBc/Hz
Frequency stability	±0.5 ppm
Input reradiation, max., within specified frequency ranges	-109 dBm (HF1/HF2 port, 0.1-25 MHz) -95 dBm (RF port, 25-1100 MHz) -70 dBm (RF port, 1100-8000 MHz)
USB control latency, typ.	0.8-1.2 ms