## PRODUCT DESCRIPTION:

The FSM-IMX570 Devkit delivers compact and high-resolution indirect Time-Of-Flight (iTOF) technology integrating the Sony® IMX570PLR-C sensor. This "off-the-shelf" Devkit reduces your time-to-market by providing a complete and calibrated assembly; a sensor board, lens, illumination board, power board, adapters, and drivers. Prototype quickly and capture fast moving 3D data in low lighting conditions. Experience high-precision object depth mapping with onboard Sony DepthSense™ and compile results as a reference point to take advantage of our fully customizable solutions.

### Features

- Back-illuminated Sony IMX570PLR-C  iToF 640 x 480 sensor.

- Drivers and demo application for NVIDIA® Jetson  AGX Orin™  and AGX Xavier™.

- PixelMate™ MIPI CSI-2 Interface for robust connectivity.

- Onboard Sony DepthSense™ Sensor Edge Processor (SEP) performing depth calculation and correction.

- Support for Multi-Sensor Synchronization (ToF, RGB).
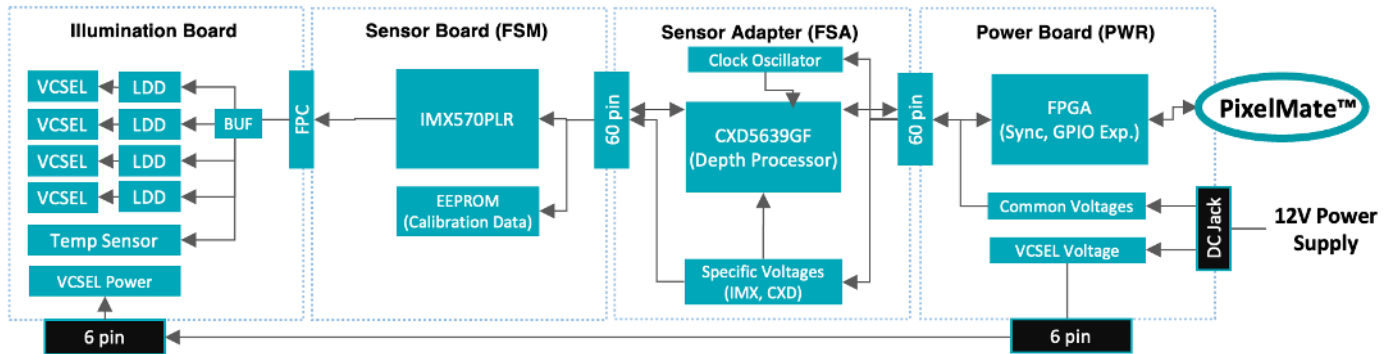
### Application

- Operate iTOF technology and IMX570 in your environment and evaluate the technological applicability and performance.

- Benefit from the open platform by diving down to the component level, and gauge your own implementation of depth processing against Sony's reference.

- Make educated "build vs buy" decisions and benefit from FRAMOS's long-term camera development experience for your tailored productization.

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## SYSTEM DIAGRAM:



## SPECIFICATIONS:

### Image Sensor
- Type: Sony IMX570PLR-C
- Technology: Sony DepthSense™
- Shutter: CMOS Global
- Resolution: 640 x 480
- Pixel Size: 5 µm x 5 µm
- Optical Format: 1/4.5"
- Sensor Framerate (RAW): 56 fps (4-phases)

### Optical Attributes
- Field of View (HxV): 60° x 45°
- Operating Wavelength: 940 nm
- Lens Type: 2.88 mm, F#1.2, 930 – 980 nm (FPL-307610)
- Mount Type: M12
- Assembly: Focused (0.4 m to infinity) and Fixed (Calibrated, not adjustable / interchangeable)

### Illumination
- 4x VCSEL Laser Diode @ 940 nm (Osram V105Q121A- 940)
- 4x Laser Driver (Sony CXA4026GF)

### Depth Processor (On-Board)
- Type: Sony CXD5639GF
- Modes: 20 MHz, 120 MHz (Single / Dual Mode)
- Output Resolution: 640 x 480

### Supported Framerate(s)
- 30 fps (continuous operation)
- Up to 56 fps (limited duration)

### Synchronization
- External : Yes (XVS used for Frame Trigger)
- Multi-ToF: Yes (maximum 4 units, TDMA method)
- RGB: Yes (through use of XVS)
  RGB sensor is not supplied with this kit.

### Calibration (per device, full scope)
- Calibration Methods: Thermal, Cyclic, Global/Lens/Gradient
- Calibration Storage: On device EEPROM (binary)

## ACCURACY AND PRECISION:

Results available on request.

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## ENVIRONMENT, SAFETY AND MECHANICAL DETAILS:

### Safety and Compliance

- CE
- RoHS
- REACH
- WEEE
- Laser Safety: Accessible emissions not exceeding Laser Class 1, IEC 60825-1:2014 (Edition 3.0)

Please note that the provided classification does not include the analysis of single fault conditions; in the case of OEM products, the classification of the product is in the responsibility of the manufacturer of the final product, who is not FRAMOS.

**Note** The equipped VCSEL laser diodes emit non-visible light with accessible emissions not exceeding a CLASS 1 OEM laser product. Users of this device must read and understand the User Manual before operating the equipment.

### Environment and Storage

Continuous Operating Temperature (Ambient): 0°C to +25°C

**CAUTION** Ambient operating temperature is specified at maximum exposure time of 1000 μs and 30 fps without additional heat sinking. Extended operation can be achieved by additional heat dissipation of the illumination front-end. Device controls will shut down the VCSELs before reaching harmful temperatures.

Storage Temperature: -30°C to +80°C
Power Consumption (Average, Peak):

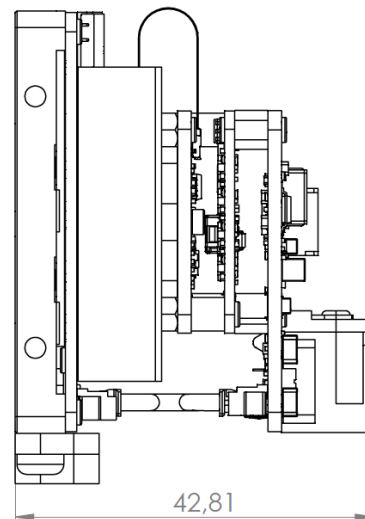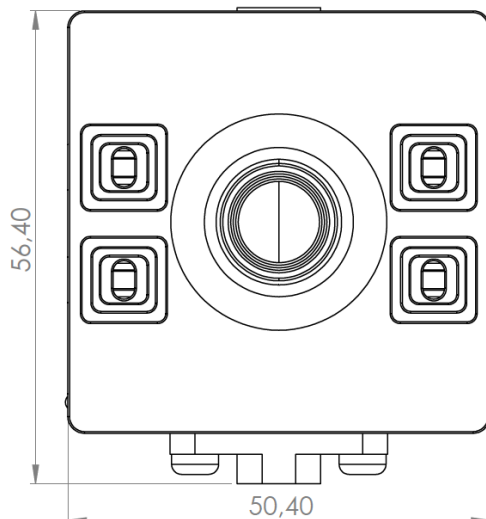| Framerate | Exposure | Power Avg | Power Peak |
|---|---|---|---|
| 30 fps | 1000 μs (x4) | 6.12 W | 34.92 W |
| 56 fps | 1000 μs (x4) | 9.72 W | 33.96 W |

### Physical Attributes

Mechanical size (H x W x D): 56.4 x 50.4 x 42.8 mm
Weight: 91 g

Modifications to optical attributes, form, function, or performance, are supported on a per project basis.

Further documentation on the mechanical and electrical interfaces, technical drawings, and 3D models are provided on request at: support@framos.com

## MECHANICAL DRAWING:

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## SOFTWARE AND DRIVER:

The software package contains a reference implementation of the MIPI CSI-2 driver, demonstrating how to utilize the platform specific data interface, implement communication and initialize the image sensor and it's peripherals (VCSEL Drivers, Depth Processor) with easy access to their main features. The software package enables embedded software engineers to access the streaming system and provides ready access to tools that are needed to adapt it to the individual needs of the application.

## DRIVER PACKAGE CONTENT AND IMPLEMENTED FUNCTIONS:

### Scope of the Package
- Platform and device drivers for Linux for Tegra
- NVIDIA® Jetpack 5.1 / L4T 35.2.1
- V4L2 based subdevice drivers (low-level C API)
- Streamlined V4L2 library (LibSV), C/C++ API
- Displaying example

### Supported Platforms
- NVIDIA® Jetson AGX Orin™ Developer Kit
- NVIDIA® Jetson AGX Xavier™ Developer Kit

### Parameter Access:
- Exposure Time Control: 15 - 1000 $\mu$s
- Sensor Operation Mode (Master, Slave)
- Frame Rate Control: Yes (Results Pending)

### Depth Operating Modes:
- Single Frequency:
  - Short Range (120 MHz):    0.4 – 1.25 m
  - Long Range (20 MHz):    0.4 – 7.5 m
- Dual Mode (20/120 MHz):    0.4 – 7.5 m
- Bypass Mode (RAW)*
  *Unprocessed sensor/phase data.

### Data Formats:
- Depth:    RAW8 (XYZC, 12 bytes per pixel)
  7680 x 480 (640 * 12 x 480)
- RAW:    RAW12 (2 Taps * 4 phases per pixel)
  1280 x 1920 (640 * 2 x 480 x 4)

## ORDERING INFORMATION:

**Order Code:** FSM-IMX570D/TXA_Devkit-Single-940/60A-V1A

Bill of materials outlining the items contained in this order code are shown below. To order or request additional information, please contact: sales@framos.com

| Item | Description | Qty |
|---|---|---|
| FSM-IMX570D-Bundle-Cal-940/60A-v1a | Sensor, Illumination, Processing, Power Board stack with focused lens, heat sink, and mechanical front plate (Calibrated) | 1 |
| FMA-FC-150/60-v1a | Flex Cable, PixelMate™ (CSI-2), 150 mm | 1 |
| FPA-4.A/TXA-v1b | FRAMOS Processor Adapter with 4x PixelMate™ to NVIDIA® Jetson™ developer kits | 1 |
| V-TAC VT-23079 | Desktop Power Supply (12V / 6.5A) | 1 |
| Quick Start Guide | Printed in box with instructions, references and disclaimer | 1 |

**Note**  Applicable NVIDIA® Jetson™ Developer Kit and tripod not included.

**CAUTION**  Disassembling pre-assembled components within BOM item 1 (FSM-IMX570D-Bundle-Cal-940/60A-v1a) will void device calibration.