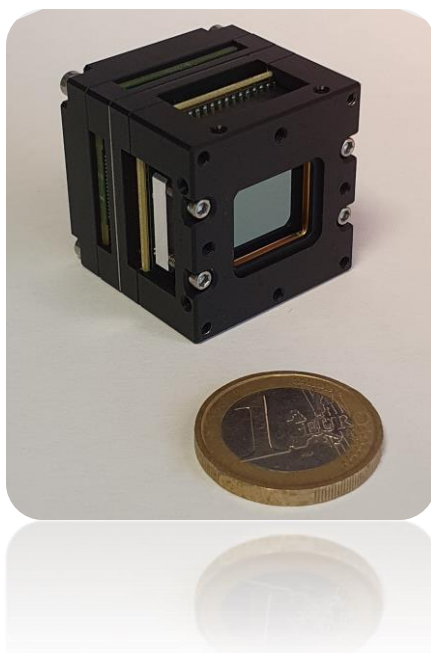# IrLugX320P™ ■▪

Device-ALab

IrLugX320P Thermal Imaging Handheld Platform
Compact OEM 12µm QVGA Resolution
Uncooled Infrared SWaP Platform

- Ultimate Embedded Solution for Handheld Systems Makers -

IrLugX320P is a simple and immediate solution for integrators of handheld infrared devices (such as monocular, binocular, head-up displays). It can also be the reference design to be customized and become the handheld core part of the finished end-product of system integrator.

IrLugX320P model embeds a **12µm** 320x240 pixels of thermal core. It joins the growing list of implementations of DEVICE-ALAB infrared engine cores.
It features low-power consumption, providing an agility of configurations and addressing the medium volume application makers.

IrLugX320P is the ideal plug and play handheld platform, offering altogether hardware and software for **image processing, power management and control.** It complies to **video digital standards BT656_8 or YCbCr_10 or Mono_16** to stream video to interface digital display unit (OLED, LCD…) and standard video output as analog PAL/NTSC or Digital. A firmware reference design

on a small MCU enables the system integrator to design and manage **his own overlay, reticle, symbol and text,** as well as **handling the battery power** and **customizing the buttons pad.**

IrLugX320P is ready for **integration into your application thanks to a GUI** which provides high level services (configuration and control). This enables to customize and to inlay the application embedded as overlay, reticle, symbol and texts.
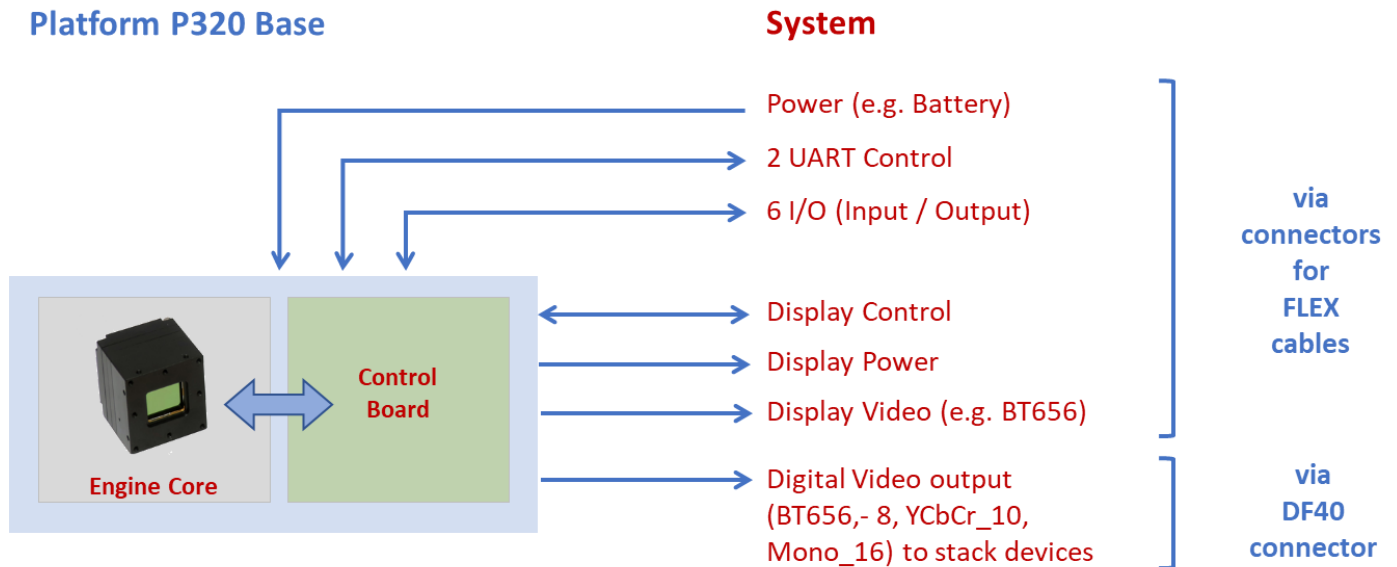
SCOPE OF USE

Handheld Thermal Imaging camera
Night Vision Goggles and Sights
Clip-on Sights
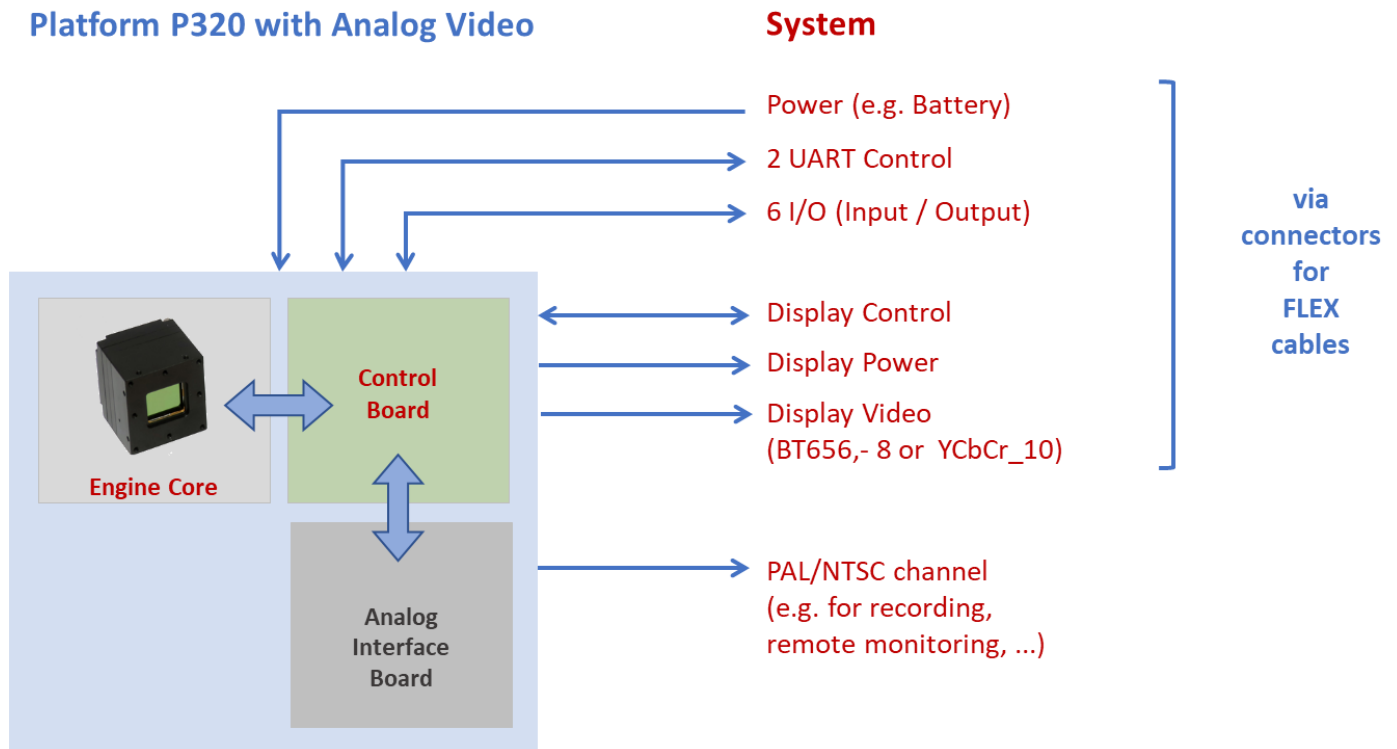Dismounted Soldier Devices
Monocular and Binocular
Fusion Imaging Core

IrLugX320P™ ▪▫

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Plug, Sense&Play the Heat
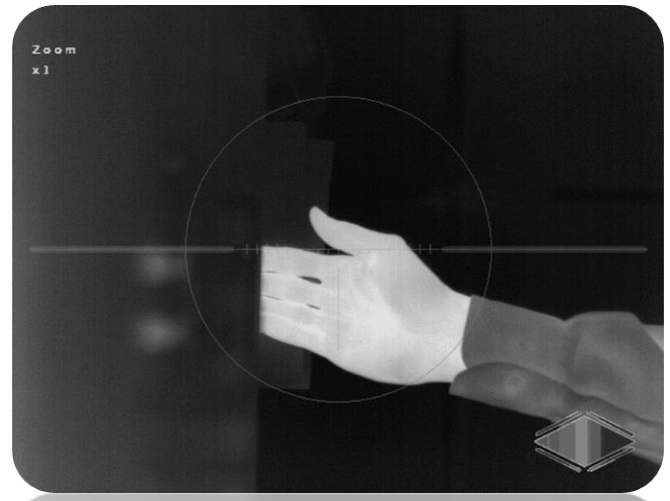
HANDHELD PLATFORM ARCHITECTURE AND POSSIBLE EXTERNAL INTERFACE UNITS

Two configurations are available

Platform P320 Base

System

Power (e.g. Battery)

2 UART Control

6 I/O (Input / Output)

Engine Core — **Control Board**

Display Control

Display Power

Display Video (e.g. BT656)

via connectors for FLEX cables

Digital Video output (BT656,- 8, YCbCr_10, Mono_16) to stack devices

via DF40 connector

Platform P320 with Analog Video

System

Power (e.g. Battery)

2 UART Control

6 I/O (Input / Output)

Engine Core — **Control Board**

Display Control

Display Power

Display Video (BT656,- 8 or YCbCr_10)

via connectors for FLEX cables

Analog Interface Board

PAL/NTSC channel (e.g. for recording, remote monitoring, …)

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GUI (GRAPHIC USER INTERFACE)

A user-friendly interface - **natively provided with DEVICE-ALAB Engine Core -** enables system integrator to set-up the camera in a very intuitive manner: BPR (Bad Pixel Replacement), NUC (Non Uniformity Correction), Calibration (shutterless), AGC (Automatic Gain Correction…), Reticles, Symbols, Text inlays can be managed with a few clicks for an optimal set-up.

The GUI includes the manager and maker of the **embedded custom application** (see illustration hereafter)
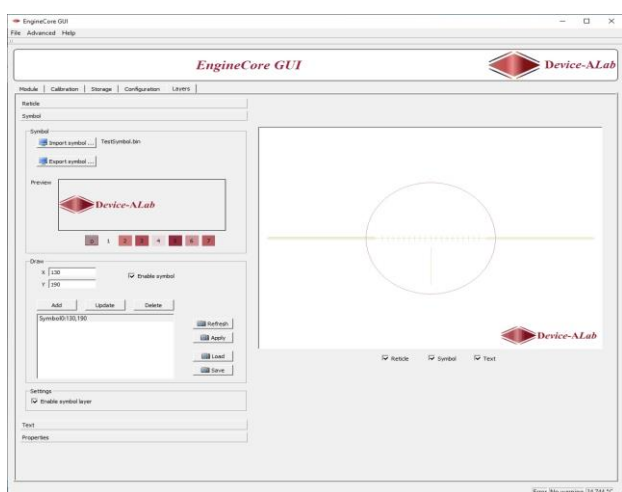
FIRMWARE REFERENCE DESIGN

An open source software - **with a micro-controller device embedded on DEVICE-ALAB Control Board** - provides full access of application services. As such, the system integrator can natively manage the video stream and implement the user interface (push buttons and menu), handles overlay, symbol, text inlays and drive the display unit of its choice.
This firmware reference design is based on FreeRTOS and delivered in C.

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KEY TECHNICAL SPECIFICATIONS OF HANDHELD PLATFORM BASE

FEATURES	IrLugX320P	DESCRIPTION
Camera resolution	320x240 pixels	Micro-bolometer technology with 12μm pixel pitch
		IrLugX320P fits to ATTO320-60Hz
Spectral response (LWIR)	8 – 14 μm	Without optic
NETD (F/1 ; 300K ; @30 Hz)	< 60 mK	Can be optimized on demand only
Power consumption	< 1.4 W	@ 30 Hz Frame rate with Shutter-Less mode set ON
Interface connector	DF40C-60DP (Header)	and other connectors for flex cables
Video:		
Format	BT656 (8 bits)	Only NUC and BPC treatment available in Mono16
	YCbCr (10 bits)	
	Mono16 (16bits)	
External Pixel Clock Synchronization	No	
Digital output/input:		
Control	UART	
Upgrade	UART	
Electrical digital output/Input:	3.3V CMOS	
Charge of type of battery	Per 2 cells or 4 cells (Ni-CD, Ni-MH, Li-Ion)	
Power Supply Voltage Input	3.5V to 14V	
Power Supply Output	5V	Limited to 100mA max
External Frame trigger	No	Not available
Machanical Shutter	No	
Mechanical Shutter management	No	Not available
Shutter-Less	Optional	Two points Shutter-less (optional on demand)
User Configuration Storage	1 to 8	On module
Storage Calibration Table	Up to 2	On module for Shutter-less
Time to image	< 3 s	Time from power ON at power supply to first useable image
Image Processing:		Configuration dependence
Calibration	Yes	Two point calibration (software trigged)
		One point calibration (software trigged)
Image Optimization	NUC; BPC; AGC (Brightness, Contrast)	AGC: Linear 1%; Enhanced; Manual, ROI, Smooth
Rescale	x1 to x4	Continuous zoom, depending on configuration
Color Rendering	Yes	White Hot; Black Hot; Glow; Fire; Iron; Rainbow; Custom
Overlay Reticule	4	including alignment compensation
Overlay Symbols	28	8 colors with transparency per symbols, configurable size and position
Overlay Text	2 fonts	Configurable fonts
Image Flip	Yes	
Full Frame Rate	60 Hz	Full Frame rate on demand only
	30 Hz (standard)	
Nominal Frame Rate	9 Hz	
Exportable Frame Rate		
Qualification grade	Industrial (Standard grade)	
	Extended or Military (MIL-STD-810G)	For Military grade only with selective sorting test concerning climatic stress
		screening based on MIL-HDBK-2164A
Mechanical Shock (TWS)	1000g, 0.4ms, ½ sine X & Y axis	To be qualified
	700g, 0.3ms, ½ sine Z axis	For only configuration of module without shutter
Operating temperature range	-20°C ; +60°C (Standard grade)	
	-40°C; +70°C (Extended or Military grade)	
Size: Length x Width x Height	30.0 x 30.0 x 27 mm^3	With open casing, excluding optics
Weight	< 40 g	With open casing, excluding optics
Storage Data Retention	> 20 years	

Customer configurations available on demand for following interfaces: Analog video output (PAL-NTSC) with specific power supply

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KEY TECHNICAL SPECIFICATIONS OF HANDHELD PLATFORM WITH ANALOG VIDEO (PAL-NTSC)

FEATURES	PARAMETERS	DESCRIPTION
Base Camera Resolution	320 x 240 pixels	Micro-bolometer technology with 12µm pixel pitch
		IrLugX320P fits to ATTO320-60Hz
Spectral response (LWIR)	8 – 14 µm	Without optics
NETD (F/1 ; 300K ; @30 Hz)	< 60 mK	Can be optimized on demand only
Power consumption	< 1.8 W	@ 30 Hz Frame rate with Shutter-Less mode and analog video output set ON
Image Resolution of Video Standard	288i/240i	
Standard Frame rate	25.00Hz/29.97Hz	
Exportable Frame rate	8.33Hz/7.49Hz	
Mechanical Shutter	No	
Mechanical Shutter Management	No	Not available
Shutter-Less	Optional	Two points Shutter-less (optional on demand)
User Configuration Storage	1	On module
Storage Calibration Table	Up to 8	On module
Time to image	<3s	Time from power ON at power supply to first useable image
Digital output/input:	UART	
Control	UART	
Upgrade	3.3V CMOS	
Electrical digital output/Input:		
Image Processing and calibration	Yes	**Refer to Key Specification sheet of Handheld Platform Base**
Video output 1 Connector	HD-BNC (Micro-BNC female)	can be removed on demand
Video output 2 Connector	Samtec (TEM-110-02-03.0-G-D-L1)	20 pin Connector, Mapping part: Samtec ISDE-10-D-L
Video Output Impedance	75 Ohm	
Video Output Signal Level	1V p/p	CCIR Rec. 569 for PAL/ FCC for NTSC
Video Differential Gain and Phase	+-3% / +-3°max.	CCIR Rec. 569 for PAL/ FCC for NTSC
Video Signal to Noise ratio (Unweighted,	62 dB max.	On one quiet line per CCIR Rec. 569 for PAL and @ Video output 1
5 MHz activated Low Pass filter)	59 dB max.	On one quiet line per NTC-7 for NTSC and @ Video output 1
Video Group Delay and Gain	+-0.05 µs/+-1.0dB	Ref. at 0.24 MHz to 4.3 MHz for PAL and @ Video output 1
	+-0.1 µs/+-1.0dB	Ref. at 0.20 MHz to 4.0 MHz for NTSC and @ Video output 1
Qualification grade	Industrial (Standard grade)	
	Extended or Military (MIL-STD-810G)	For Military grade only with selective sorting test concerning climatic stress screening based on MIL-HDBK-2164A
Mechanical Shock (TWS)	1000g, 0.4ms, ½ sine X & Y axis	To be qualified
	700g, 0.3ms, ½ sine Z axis	For only configuration of module without shutter
Size: Length x Width x Height	30.0 x 30.0 x 35 mm^3	With open casing & HD-BNC connector and excluding optics
Weight	< 56g	With open casing & HD-BNC connector and excluding optics
Storage Data Retention	> 20 years	

Accessory for Evaluation:
- Camera Interface Cable with Unterminated leads (Samtec SESDT-10-32-G-20.0-L)
- HD-BNC to BNC 75 Ohm Cable

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ORDER YOUR OWN AND GET IT!

VGA Handheld Platform (With open casing and standard grade)	VIDEO SPEED	LENS	DIMENSION/WEIGHT	PART NUMBER
IrLugX320P No Shutter	30 Hz	60 mm; HFOV: 3.7°; F/1.25	30 x 30 x 90 mm^3/ 280 g	P320-1201ABEGI-CXDP1-20S
IrLugX320P No Shutter	30 Hz	50 mm; HFOV: 4.4°; F/1.02	30 x 30 x 80 mm^3/ 220 g	P320-1201AANGI-CXDP1-20S
IrLugX320P No Shutter	30 Hz	35 mm; HFOV: 6.2°; F/1.14	30 x 30 x 61 mm^3/ 94 g	P320-1201AVGI-CXDP1-20S
IrLugX320P No Shutter	30 Hz	25 mm; HFOV: 8.7°; F/1.20	30 x 30 x 49 mm^3/ 115 g	P320-1201AIGI-CXDP1-20S
IrLugX320P No Shutter	30 Hz	19 mm; HFOV: 11.6°; F/1.03	30 x 30 x 49 mm^3/ 80 g	P320-1201AQGI-CXDP1-20S
IrLugX320P No Shutter	30 Hz	16.7 mm; HFOV: 13.2°; F/1.25	30 x 30 x 60 mm^3/ 78 g	P320-1201AHGI-CXDP1-20S
IrLugX320P No Shutter	30 Hz	7.5 mm; HFOV: 29.5°; F/1.40	30 x 30 x 50 mm^3/ 68 g	P320-1201AGAI-CXDP1-20S
IrLugX320P No Shutter	9 Hz	60 mm; HFOV: 3.7°; F/1.25	30 x 30 x 90 mm^3/ 280 g	P320-1201EBEGI-CXDP1-20S
IrLugX320P No Shutter	9 Hz	50 mm; HFOV: 4.4°; F/1.02	30 x 30 x 80 mm^3/ 220 g	P320-1201EANGI-CXDP1-20S
IrLugX320P No Shutter	9 Hz	35 mm; HFOV: 6.2°; F/1.14	30 x 30 x 61 mm^3/ 94 g	P320-1201EVGI-CXDP1-20S
IrLugX320P No Shutter	9 Hz	25 mm; HFOV: 8.7°; F/1.20	30 x 30 x 49 mm^3/ 115 g	P320-1201EIGI-CXDP1-20S
IrLugX320P No Shutter	9 Hz	19 mm; HFOV: 11.6°; F/1.03	30 x 30 x 49 mm^3/ 80 g	P320-1201EQGI-CXDP1-20S
IrLugX320P No Shutter	9 Hz	16.7 mm; HFOV: 13.2°; F/1.25	30 x 30 x 60 mm^3/ 78 g	P320-1201EHGI-CXDP1-20S
IrLugX320P No Shutter	9 Hz	7.5 mm; HFOV: 29.5°; F/1.40	30 x 30 x 50 mm^3/ 68 g	P320-1201EGGI-CXDP1-20S
IrLugX320P No Shutter	30 Hz	No	30 x 30 x 27 mm^3/ 40 g	P320-1201AXGI-CXDP1-20S
IrLugX320P No Shutter	9 Hz	No	30 x 30 x 27 mm^3/ 40 g	P320-1201EXGI-CXDP1-20S

VGA Handheld Platform with Analog video (PAL/NTSC) (With open casing and standard grade)	VIDEO SPEED	LENS	DIMENSION/WEIGHT	PART NUMBER
IrLugX320P No Shutter	25/30 Hz	60 mm; HFOV: 3.7°; F/1.25	30 x 30 x 98 mm^3/ 294 g	P320-1601ABEGI-CXDP1-20S
IrLugX320P No Shutter	25/30 Hz	50 mm; HFOV: 4.4°; F/1.02	30 x 30 x 88 mm^3/ 234 g	P320-1601AANGI-CXDP1-20S
IrLugX320P No Shutter	25/30 Hz	35 mm; HFOV: 6.2°; F/1.14	30 x 30 x 69 mm^3/ 108 g	P320-1601AVGI-CXDP1-20S
IrLugX320P No Shutter	25/30 Hz	25 mm; HFOV: 8.7°; F/1.20	30 x 30 x 57 mm^3/ 130 g	P320-1601AIGI-CXDP1-20S
IrLugX320P No Shutter	25/30 Hz	19 mm; HFOV: 11.6°; F/1.03	30 x 30 x 57 mm^3/ 94 g	P320-1601AQGI-CXDP1-20S
IrLugX320P No Shutter	25/30 Hz	16.7 mm; HFOV: 13.2°; F/1.25	30 x 30 x 68 mm^3/ 90 g	P320-1601AHGI-CXDP1-20S
IrLugX320P No Shutter	25/30 Hz	7.5 mm; HFOV: 29.5°; F/1.40	30 x 30 x 58 mm^3/ 82 g	P320-1601AGGI-CXDP1-20S
IrLugX320P No Shutter	8.33/7.49 Hz	60 mm; HFOV: 3.7°; F/1.25	30 x 30 x 98 mm^3/ 294 g	P320-1601EBEGI-CXDP1-20S
IrLugX320P No Shutter	8.33/7.49 Hz	50 mm; HFOV: 4.4°; F/1.02	30 x 30 x 88 mm^3/ 234 g	P320-1601EANGI-CXDP1-20S
IrLugX320P No Shutter	8.33/7.49 Hz	35 mm; HFOV: 6.2°; F/1.14	30 x 30 x 69 mm^3/ 108 g	P320-1601EVGI-CXDP1-20S
IrLugX320P No Shutter	8.33/7.49 Hz	25 mm; HFOV: 8.7°; F/1.20	30 x 30 x 57 mm^3/ 130 g	P320-1601EIGI-CXDP1-20S
IrLugX320P No Shutter	8.33/7.49 Hz	19 mm; HFOV: 11.6°; F/1.03	30 x 30 x 57 mm^3/ 94 g	P320-1601EQGI-CXDP1-20S
IrLugX320P No Shutter	8.33/7.49 Hz	16.7 mm; HFOV: 13.2°; F/1.25	30 x 30 x 68 mm^3/ 90 g	P320-1601EHGI-CXDP1-20S
IrLugX320P No Shutter	8.33/7.49 Hz	7.5 mm; HFOV: 29.5°; F/1.40	30 x 30 x 58 mm^3/ 82 g	P320-1601EGGI-CXDP1-20S
IrLugX320P No Shutter	25/30 Hz	No	30 x 30 x 35 mm^3/ 56 g	P320-1601AXGI-CXDP1-20S
IrLugX320P No Shutter	8.33/7.49 Hz	No	30 x 30 x 35 mm^3/ 56 g	P320-1601EXGI-CXDP1-20S

Note about Part numbering:

The two of three last digits 20 _mean **compatibility with display units**. These are summarized in table of compatibility version._

The very last digit means the **maturity level** of the device. For example: **S** refers to **engineering Sample.**

**M** refers to Mass production unit which is MIL-STD-810G qualified.

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COMPATIBILITY VERSION OF HANDHELD PLATFORM VERSUS THE DISPLAY UNIT

RELEASE VERSION	RELEASE DATE	NEW FEATURES
20	September 2020	MicroOled MDP01CPFC & MDM01BS driver board

WHAT'S IN THE BOX

Handheld Platform of Thermal Imaging Camera

ICD (mechanical drawings)
GUI
Firmware Reference Design
Documentation (user's guide)

Downloadable on Device-ALab website through customer access

General Notices:
This OEM handheld platform is intended only for product evaluation, development or incorporation into other product or sub-system. It is not a finished end-product fitting to general consumer use. As such, this module is out of the scope of the European Union (EU) directives concerning electromagnetic compatibility (EMC).

The products described herein are subject to French Government Export Controls regulation except for models with frame rate lower or equal to 9 Hz