ADVASPACE
radiation data

MiniPIX SPACE

Datasheet

Document version 1.0.1. AP



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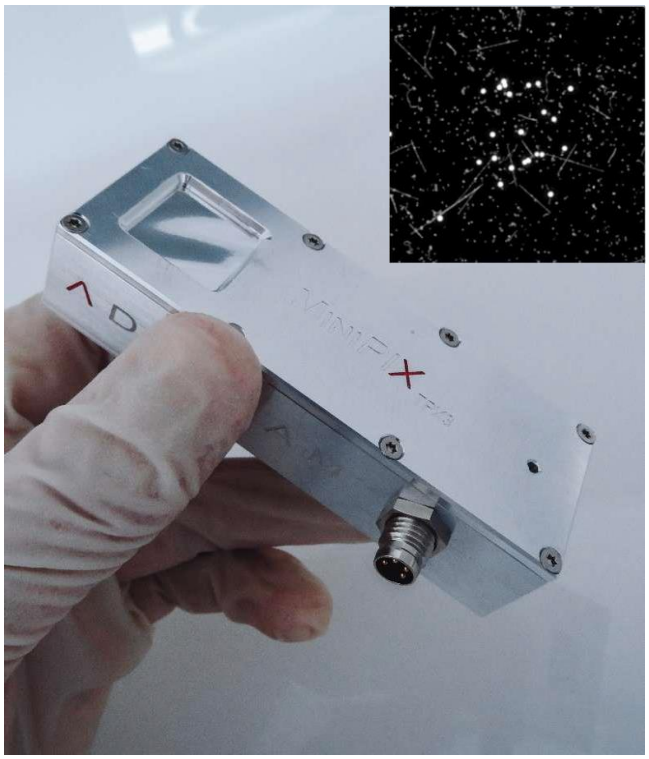
ADVASPACE
member of AdVisiones Technologies
powered by ADVACAM

General features

MiniPIX SPACE is a miniaturized, low-power radiation camera based on the Timepix family of particle-tracking and imaging chips.

The detector is position, energy and time sensitive: For each ionizing particle (e.g. X-ray photon), it digitally registers its position, energy, time of arrival, and track shape - basically all information you can want. The other measures can be calculated from the track shape (particle type, direction of flight, LET, charge…). The information on each detected particle is either read-out immediately (pixel mode) or accumulated in images (frame mode) and read out later.

The MiniPIX SPACE uses LVCMOS 2V5 for communication with a M8 connector.



SPACE Features

- 256 x 256 square pixels
- 55 μm pixel pitch.
- Timepix family of chips
- Up to 16 fps
- Several sensor materials according to customer preference (usually 500 μm thick silicon).
- Energy threshold: 5 keV
- LVCMOS 2V5
- M8 or Micro-D connector
- Robust housing

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- Conformal coating
- Low weight (usually <140 g)
- Low power (2 W)
- Heritage environmental test information Optional:
- ECSS Soldering
- ISO 8 clean room
- Custom calibration

Device parameters

Operating conditions

Symbol	Parameter	Min	Typ.	Max	Units	Comment
TA	Temperature Range (non-operational)	-25	22	80	°C	
Φ	Humidity (non-operational)	0	55	95	%	Not condensing
TA	Temperature Range (operational)	-20	22	60	°C	
Φ	Humidity (operational)	0	55	70	%	Not condensing

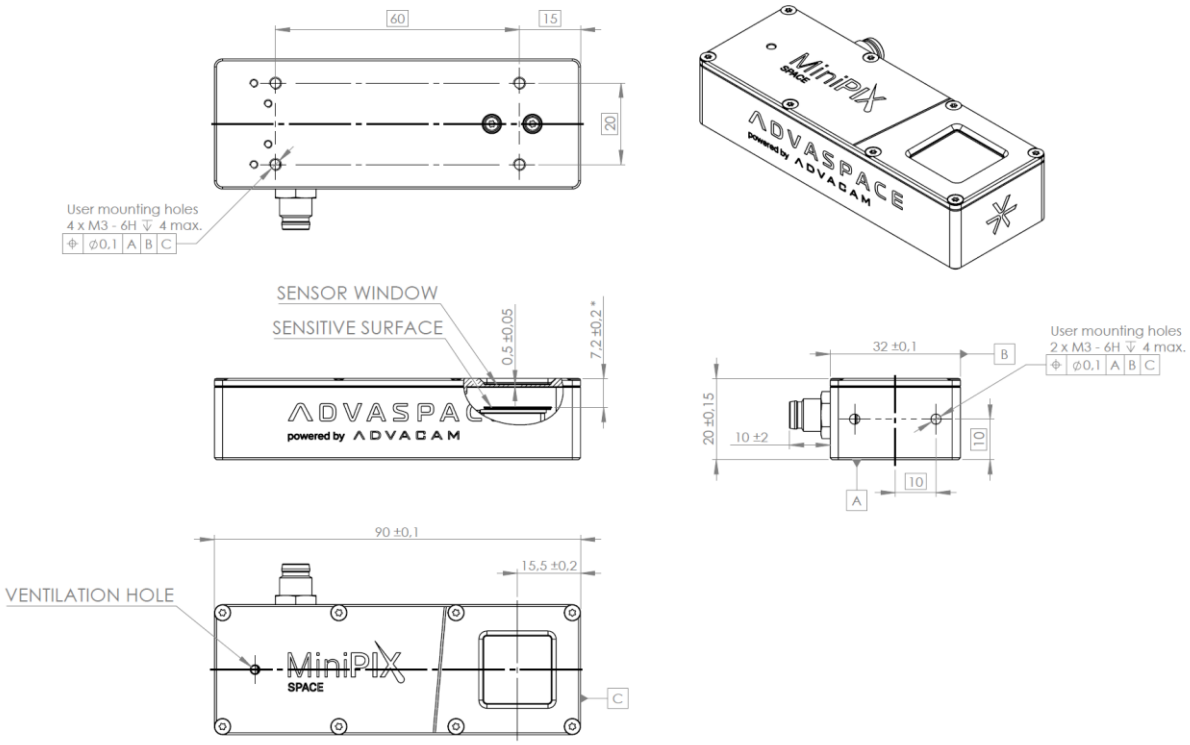
Warning: Disconnect the device from power during pumping down or venting the vacuum chamber!

Electrical Specification

T_A = 25°C, USB voltage V_{CC} = 4.8V

Symbol	Parameter	Min	Typ.	Max	Units	Comment
VCC	Supply Voltage	4.0	5.0	5.5	V	
P1	Power Dissipation		2	3	W	
Bias Voltage Source for Sensor Diode						
VBIAS	Bias Voltage (positive version)	3	80	450	V	With Si sensor
VBIAS	Bias Voltage (negative version)	-4	-400	-450	V	With CdTe or CZT

Mechanical dimensions

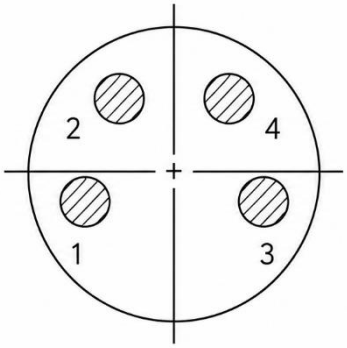


All dimensions are in mm.
* Sensitive surface distance from top of the box is stated for 500 µm sensor thickness.

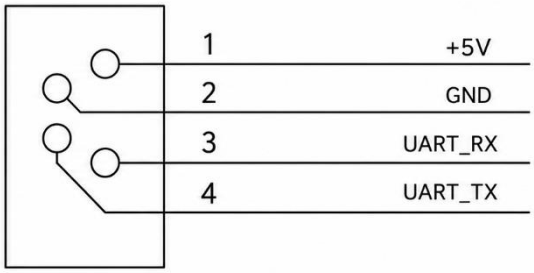
Connector

The device has a single M8 connector with 4 pins. The connector facilitates both power and data transfer. The pinout of the M8 connector can be seen on the figure below.

Contact arrangement (Plug-in side)



Connector pinout



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Enhanced mechanical properties

The SPACE version of the MiniPIX camera incorporates several enhancements to ensure robustness for space applications. The camera has undergone rigorous environmental testing in accordance with ECSS standards, including humidity testing, random vibration testing along all three axes (X, Y, Z), and thermal ambient testing. The tests were conducted with the camera configured with a 500 μm silicon sensor.

Vacuum operation

ADVACAM detectors are vacuum compatible out of the box. Operate only at air pressures below 10^-3 Pa. In case of a sudden pressure drop, the MiniPIX must be switched off. For indoor vacuum experiments. Make sure to disconnect the device from power during pumping down or venting the vacuum chamber!

External Cooling

Temperature stabilization is strongly recommended for consistent results. Passive cooling of the device is necessary and can be done by mechanical design. For active cooling, attaching a Peltier cooler or a cooling plate to the back of the detector should suffice. The temperature should be set to the calibration temperature.

Instructions for safe use



Do not touch the sensor surface!

To avoid malfunction or damage to your MiniPIX MAGIC please observe the following:

- Do not expose directly to water or condensing moisture.
- Do not disassemble. Wire-bonding connection may be irreversibly damaged.
- Do not insert any object into the sensor window.
- The maximum USB cable length is 2 m.
- Thermal stabilization of the device is strongly recommended (passive/heat sink).
- A direct connection to the host device is required for maximum performance. Connecting via a USB hub may negatively affect the performance and stability of the device.
- The protection provided by this product may be impaired if it is used in a manner not described in this document.

Disposal



Do not dispose these instruments as unsorted municipal waste. Please use separate collection facility to contact the supplier from which the instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environment impact.

Release history

Date (YY/MM/DD)	Changes	Changed by
26/05/10	Preliminary datasheet	M. Kasal
26/07/17	Connector pinout added	M. Kasal

