



## Datasheet

# MiniPIX TPX3 SPACE

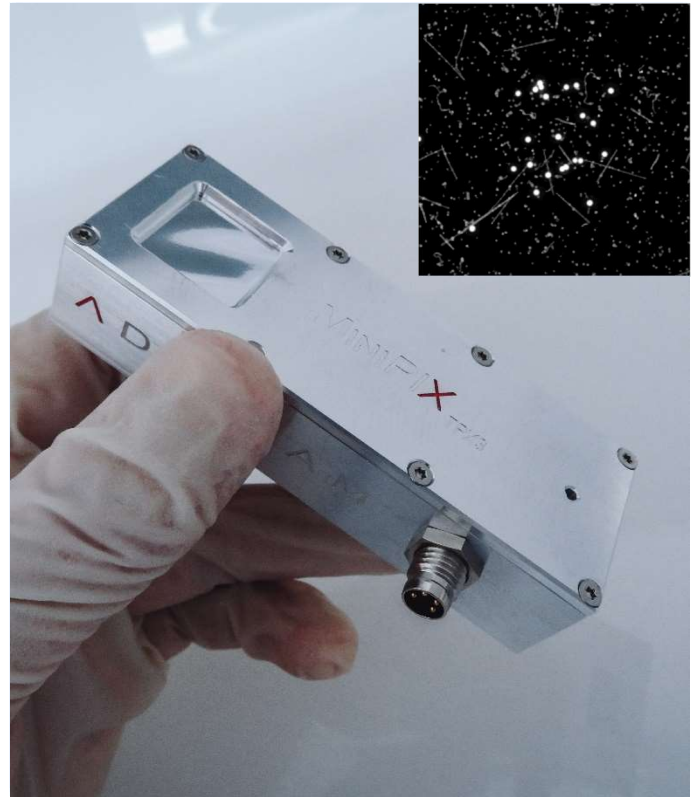
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## General features

The **MINIPIX<sub>TPX3\_SPACE</sub>** is a miniaturized and low power radiation camera equipped with Timepix3 chip for particle tracking and imaging.

The Timepix3 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<sub>TPX3\_SPACE</sub>** uses LVDS UART for communication with a robust interface connector (according to customer preference; usually M8 or Micro-d).



*Advacam's imaging cameras are direct conversion single photon counting pixel detectors that represent the cutting edge of current radiation imaging technology.*

## SPACE Features

- 256 x 256 square pixels
- 55  $\mu\text{m}$  pixel pitch.
- Timepix3 chip technology
- Up to 16 fps
- Several sensor materials according to customer preference (usually 500  $\mu\text{m}$  thick silicon).
- LVDS UART
- M8 or Micro-D connector
- Robust housing

- Conformal coating
- Low weight (usually <140 g)
- Low power (2 W)
- Heritage environmental test information

### Optional:

- ECSS Soldering
- ISO 8 clean room
- ICD
- Additional customization

## Device parameters

### Operating conditions

Symbol	Parameter	Min	Typ.	Max	Units	Comment
$T_A$	Temperature Range (non-operational)	-25	22	80	°C	
$\Phi$	Humidity (non-operational)	0	55	95	%	Not condensing
$T_A$	Temperature Range (operational)	-10	22	60	°C	
$\Phi$	Humidity (non-operational)	0	55	70	%	Not condensing

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

### Electrical Specification

$T_A = 25^\circ\text{C}$ , USB voltage  $V_{CC} = 4.8\text{V}$

Symbol	Parameter	Min	Typ.	Max	Units	Comment
$V_{CC}$	Supply Voltage	4.0	5.0	5.5	V	
P1	Power Dissipation		2	3	W	
<b>Bias Voltage Source for Sensor Diode</b>						
$V_{BIAS}$	Bias Voltage (positive version)	3	80	450	V	With Si sensor
$V_{BIAS}$	Bias Voltage (negative version)	-4	80	-450	V	With CdTe or CZT senso

## Enhanced mechanical properties

The SPACE version of the MiniPIX camera incorporates several enhancements to ensure its robustness for space use. The camera has undergone rigorous environmental testing, including a humidity test, a vibration test in all three axes (x, y, z), and a thermal ambient test under ECSS standards.

## Vacuum operation

Advacam detectors are vacuum compatible out of the box. Operate only with air pressure lower than 10-3 Pa. In case of 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 cooling or cooling plate at the back of the detector should serve the purpose. The temperature should be set to 22°C.



*The **MINIPIX-TPX3\_SPACE** is a miniaturized and low power radiation camera equipped with Timepix3 chip for particle tracking and imaging is already on board of the ISS and several satellites.*