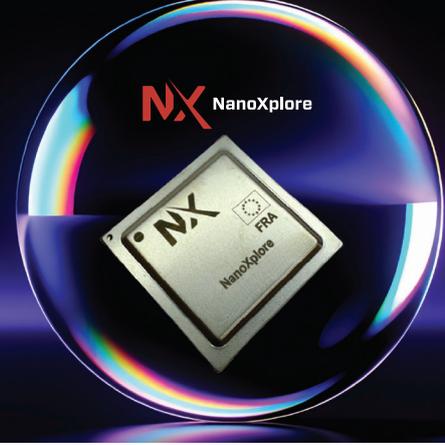


# ULTRA300

## Product Brief

NanoXplore, a European fabless company, is proud to offer innovative solutions in FPGA, SoC FPGA and ASICs technologies through a 100% European design and supply chain.

In partnership with ESA, CNES and the European Commission, NanoXplore offers sovereignty and ITAR-free solutions to European institutions and industries for Space, Defense and high-reliability systems.



### Target Applications

#### Payload Processing

- » Imaging & Remote Sensing
- » High performance DSP blocks

#### Sensor Management & Instrument Electronics

- » Front-End Management: High-speed, low latency
- » Precision Control: ultra fast, real-time control

#### Mid-Bandwidth Communication Payloads Software Defined Radio (SDR) Multi-mission communication hubs

- » Signal Processing
- » Data Aggregation

#### Spacecraft Avionics & Defense Systems

- » High-Speed Connectivity: rapid interboard communication
- » Subsystem Coordination
- » Mission Integrity: secure processing of encrypted communication

#### Integrated Mixed-Signal Instrumentation "Housekeeping"

- » Embedded Interface: Built-in ADC and DAC
- » SWaP Optimization: PCB footprint reduced through consolidation of analog and digital functions



### Applications examples

- » On Board Computing
- » GEO Satellite
- » Light Detection And Ranging (LiDAR)
- » Multi Spectral Video Processing
- » Scientific Instruments

### Overview

The ULTRA300 represents the second generation of NanoXplore's flight-proven Radiation-Hardened by Design (RHBD) architecture. By synergizing advanced hardening-by-design techniques with the 28nm FD-SOI (Fully Depleted Silicon-On-Insulator) process, the ULTRA300 delivers industry-leading resilience against radiation effects and thermal stress. It is specifically engineered to bridge the gap between high-performance processing and extreme environmental survivability.

### Key Differentiators

- » Full radiation immunity for high-reliability in harsh space environments.
- » Integrated ADC/DAC providing a direct analog interface.
- » Integrated security to prevent tampering or IP corruption.
- » 100% European Supply Chain to guarantee independence and long-term product availability.

### Architecture Overview



## Key Features

### High-density FPGA fabric:

- » Logic: 4 LUT + DFF, Carry
- » Memory blocks
  - » 48 Kb DPRAM block with EDAC
  - » 32 x 18 b DPREG (CDC, async FIFOs)
- » DSP 19 x 24 Multipliers
- » PLLs & HW clocking primitives (WFG, CSW)

### High-speed I/O:

- » Up to 16 x 400 Mbps SpaceWire PHY
- » DDR 2/3 PHYs
- » SERDES, SDR/DDR, IO Delays for other protocols

### Up to 16 x 12.5 Gbps HSSL

### ADC x 4 – 12 bits – 5 Mbps

### DAC x 4 – 10 bits – 2 Mbps

### Reliability mechanism:

- » Memory EDAC
- » Embedded configuration memory scrubbing
- » Fast automatic memory configuration repair

### Radiation Performance:

- » SEU immune up to LET > 62 MeV.cm<sup>2</sup>/mg.
- » Latch-up free up to LET > 62 MeV.cm<sup>2</sup>/mg.
- » Total ionizing dose up to 50 Krads (Si).

### Hardware Security features:

- » Bitstream AES 256 bits encryption
- » Readback and tampering protections
- » Anti-rollback protection

### High-reliable configuration modes:

- » Master Serial SPI (Single, Sequential, TMR), SpaceWire, JTAG, Parallel 16 bits

Device	NX2H300TSA BGA 484	NX2H300TSA BGA 1152
<b>Logic Modules</b>		
· Register (#)	273 408	273 408
· LUT-4 (#)	290 496	290 496
· Carry (#)	68 352	68 352
<b>Embedded RAM (Mb)</b>		
· DPRAM (Kb)	21 504	21 504
· Core Register Files (Kb)	1 424	1 424
<b>Clocks / PLL</b>		
50/7		
<b>Additional Features</b>		
· DDR2/3 PHY	20	20
· Embedded DSP	896	896
· SpaceWire PHY I/F 400 Mbps	20	20
· SERDES Tx/Rx 12.5 Gbps	4	16
· ADC / DAC	4/4	4/4
<b>Security feature</b>		
YES		
<b>Inputs / Outputs</b>		
· High-Speed I/O (HSIO) bank 1,2 V – 1,5 V – 1,8 V	4x34 I/Os	10x34 I/Os
· General Purpose I/O (GPIO) bank 1,8 V – 2,5 V – 3,3 V	1x16 I/Os + 4x24 I/Os	1x16 I/Os + 6x24 I/Os
· Service I/O bank 3,3 V	48	57
<b>Packages – User I/Os</b>		
239 I/Os		
500 I/Os		

## ULTRA300 Products

Space – ULTRA300 RH	Commercial – ULTRA300
<ul style="list-style-type: none"> <li>» Prototype, +25°C</li> <li>» Engineering model (-40°+125°C)</li> <li>» Equivalent Flight model</li> <li>» Flight Model ESCC 9030 Class 1</li> <li>» Daisy Chain for continuity tests</li> </ul>	<ul style="list-style-type: none"> <li>» Commercial grade (0°+70°)</li> <li>» Industrial grade (-40°+125°C)</li> </ul>

For more information about **ULTRA300**: [www.nanoxplore.com/product/ultra-300/](http://www.nanoxplore.com/product/ultra-300/)