

nano-ONYX

Ultra-Small Form Factor for extreme Aerospace and Military missions



SWaP=1.5l, 1.5kg, 15W

► Compliant with 1.5 liters, 1.5 kg and 15 Watts SWaP constraints

nano-ONYX is an Ultra-SFF rugged embedded computer imagined and manufactured by ECRIN Systems targeting aerospace tactical missions embedded in UAS, UCAV, fixed and rotary wings (un)manned aircrafts. But other defense applications in ground vehicles and underwater robots will discover many advantages to integrate nano-ONYX when high performance embedded computing is not so important than low power in small foot print light weight.

nano-ONYX is based on Dual / Quad-Core Intel® Atom™ E39xx (Apollo Lake) processor with TDP starting from 6.5 Watts for low power applications. For higher performance, it will integrate Dual-Core Intel® Core™ i7 Kaby Lake-U or later Quad-Core Whiskey Lake-U with configurable TDP-down 7.5 Watts. nano-ONYX will offer distribute computing and avoid single-point of failure and thermal hot spots. Qualified nano-ONYX slashes design risk, reduces cost and boosts deployment. Thanks to risk-lowering of proven technology and Environment Qualification passed, nano-ONYX saves strongly your design and EQT fees.

Nano-ONYX is based on modular mezzanines concept that offers customer a large flexibility and Long-Life Management with revision control. It employs cutting edge technology based on mini COM Express type 10 from PICMG consortium and four state-of-the-art AcroPack® mPCIe-based Rugged I/O Modules with solid down connector I/O interface (no flimsy ribbon I/O cables) for high-density, high-reliability and high-performance, that will allow tailoring the configuration to exact customer's I/O requirements, no more, no less.

> Atom™ E39x0 1.3GHz to 1.6GHz, 6W to 12W,
Dual to Quad-Core

> Core™ i7-7600U, 2.8GHz 15W, Dual-Core;
Core™ i7-8600U, 1.7GHz, 15W, Quad-Core

> Up to 8 GB Dual channel DDR3L/DDR4 at 1866/2400 MT/s

> 1x DVI-D single link graphic output

> 2x GbE

> 2x RS-232, 2x RS-422 and 4x USB 2.0

> 4x AcroPack / miniPCIe slots for Avionics,
Wireless and Industrial I/O

> TPM 2.0; BIT functions

> 1x internal M.2 SSD slot; 1x removable 2.5" SSD (option)

> Cableless, fanless, micro MIL-DTL-38999 connectors

> Qualified DO-160 and MIL-STD-810/461/1275/704

> -40°C up to +71°C operating; Shock: 40G@1ms

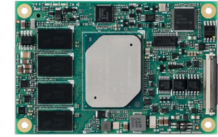
> Long Life Management with revision control

> ITAR free without export control

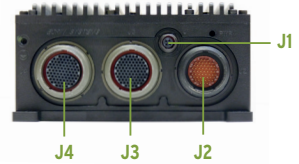
> High flexibility to Modified COTS services

System specifications

Processor / Memory	Atom™ E3950 1.6/2.0GHz, 12W (4C/1866), up to 8GB DDR3L soldered Atom™ E3940 1.6/1.8GHz, 9W (4C/1866), 2GB DDR3L soldered Atom™ E3930 1.3/1.8GHz, 6W (2C/1866), 2GB DDR3L soldered Intel® Core™ i7-7600U 2.8/3.9GHz, 15W (2C/2133), 4GB DDR4 soldered Intel® Core™ i7-8600U 1.7/4.4GHz, 15W (4C/2400), up to 8 DDR4 soldered (2020)
Video	1x DVI-D single link output
Ethernet	2x 10/100/1000Base-T Ethernet (GigE Vision compatible) Option for 3x extra GbE with PoE function (via AcroPacks)
Audio	1x Line In, 1x Line Out
USB	4x USB2.0
Serial	2x RS232 (Tx, Rx, GND) 2x RS422 (Tx+, Tx-, Rx+, Rx-, GND)
GPIO	2x GP Inputs (LVTTTL) 2x GP Outputs (LVTTTL)
GPS	GPS antenna and 1 pps (via miniPCIe function)
Storage	1x M.2 (S42) SATA SSD internal slot 1x Removable 2.5" SSD, 100.000 insert/extractions (factory fit)
Expansion slots	4x AcroPack / miniPCIe slots
Discrete I/O	On front panel: Power LED On MIL-DTL-38999 connector: Power button (ATX/AT CPLD mode), Reset button
Hardware Monitoring	Supply voltages, CPU, carrier board temperature sensors



Apollo Lake COMe Type 10



- J1: +28VDC; 3 pts
- J2: 2x GbE, DVI-D, 2x USB, RS 232/422, Antenna, 1x pps, PWR-ON & reset Btn; 55 pts
- J3: AP #3 & #4 (30-pin), 2x USB, RS 232/422, Audio; 85 pts
- J4: AP #1 (50-pin), AP #2 (30-pin), 4x GPIO; 85 pts

Power supply

Power Input	+28VDC (+12VDC up to +36VDC) EMI filtering according to DO-160 / MIL-STD-461 / MIL-STD-704 / MIL-STD-1275
Power consumption	Up to 25 Watts (<15 Watts typic)

SWaP-C constraints

Size (WxDxH)	Standard version: w/o 38999 connectors: (D) 175mm x (W) 135mm x (H) 65mm; # 1,5 liters nano-ONYX-SSD version: w/o 38999 connectors: (D) 175mm x (W) 135mm x (H) 94mm; # 2,3 liters
Weight	#1,5kg (3.3 lbs) in standard version (BOM dependent)
LRU	Provided with 4 captive screws and 2 blind holes for grounding
Cooling types	Conduction cooled system: convection & radiation by fins, conduction by cold plate or forced air flow
Connectors	Military circular IP67 locking connectors (micro MIL-DTL-38999) Front panel customizable for specific applications

Environmental Qualification Tests

Operating temperature	-40°C / +55°C to +71°C (depend on BOM and cooling system)	Salt fog	50% salt spray @ 96h; DO-160G section 14 Cat T
Storage temperature	-40°C / +85°C	Sand & Dust	Wind and fine dust particles; DO-160
Ingress protection rating	IP67	Shock & vibration	40g@11ms & Method 514.6/cat20 GM; MIL-STD-810G
Altitude	From 752mbar (8000ft) to 116mbar (5000ft); DO-160	EMI / RFI	MIL-STD-461F / DO-160
Humidity	0%-95% @ 65°C and 0-85°C @ 38°C RH; DO-160	CE certification	EMC : 2014/30/UE ; EN 61000-6-2, EN55032, EN 55024 SAFETY: 2014/35/UE; EN60950-1: 2006 2 nd edition A11 : 2009 + A1 : 2010 + A12 : 2011 + A2 : 2014

Security & dependability

Trusted platform module	TPM 2.0, Infineon component
Built-In-Test	BIT, monitoring functions library, maintenance L2 with SEMA Board Controller*

Software corner

Operating system	Windows 10 32/64-bit, Linux 32/64-bit, ElinOS. For other requirements, contact ECRIN Systems
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Export control classification

CECC	ITAR Free - No export control (ECCN 4A003)
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Other specifications

MTBF	TBC following MIL-HDBK-217F
Regulatory compliance	European CE Mark, REACH, RoHS, WEEE, CoC
Warranty	1-year return to factory (extended warranty available with service contract)
Starter cable set	Breakout cable set mates with MIL-DTL-38999 connectors to break out standard CPU I/O and power signals to traditional PC style interfaces for lab purposes
Development kit	Open Starter kit based on same hardware building blocks for quick and easy integration and debugging

* not available for Intel® Core™ i7-7600U

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