

ARQUIMEA

Passion for Technology

**European Space Components Conference
ESCCON 2019**

ESTEC, March 11 – 13, 2019

COMPANY OVERVIEW

Design House specialized in **parts and systems** for **space** and **hi-rel** applications

Sister companies in Madrid (ES) and Frankfurt Oder (DE)

Suppliers of **electronics, microelectronics** and **mechanisms**

Strong **R&D** activity and **product-oriented** strategy



 EUR 10.5M revenues in FY19

 42 employees

ARQUIMEA



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DEUTSCHLAND



RAD-HARD ASICs/FPGAs

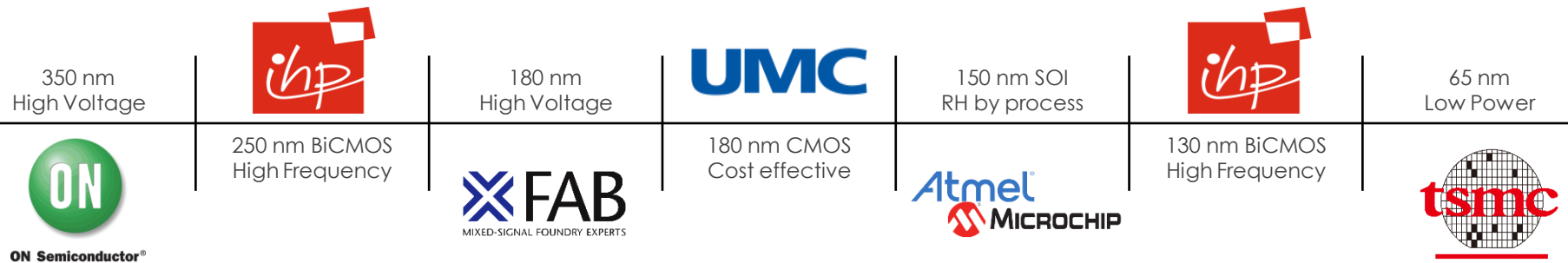
WE ARE FABLESS

Experts in analog, digital and mixed signal

Own proprietary rad-hard IPs in several technologies. Unrestricted access to rad-hard standard libraries

Flexible supply chain. Packaging and quality flows adapted to customer needs

One-stop shop. Turnkey solutions

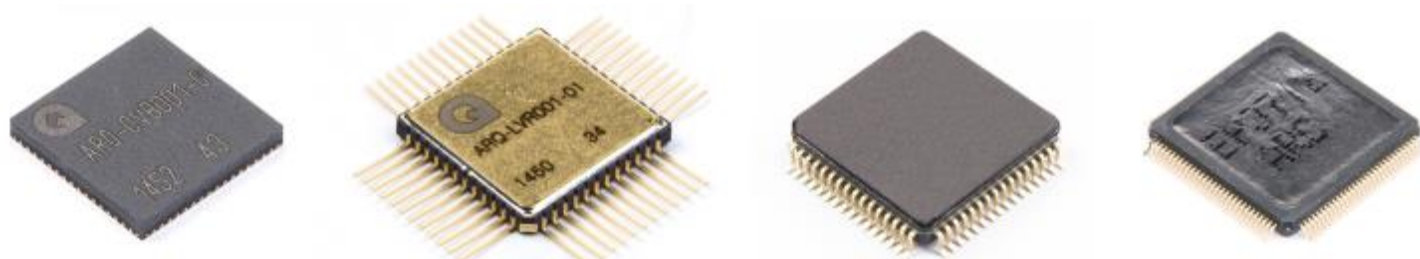


Cost reduction and better performance in your equipment by:

Replacing costly flight FPGAs by digital ASICs in high-volume applications → **FPGA to ASIC conversion**









Integrating many functionalities into a single chip

Reducing the amount of EEE parts in electronic equipment



RAD-HARD ASICs/FPGAs

Main projects

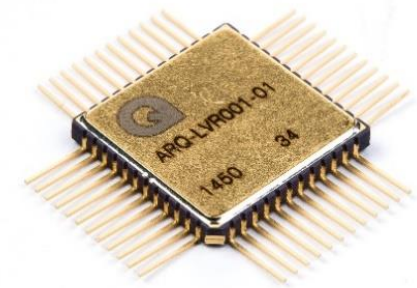
REDSAT ASIC chipset ELSA	<p>Management of the Multichip Control Module (MCCM) of a reconfigurable active array antenna (Ku Band).</p> <p>600+ chips in a single mission (Hispasat 36W-1 GEO comsat)</p>		
COSMIC VISION	<p>Front End Readout ASIC for Cosmic Vision Instrumentation Payload</p>		
RTU ASIC	<p>Control and management of Data I/O Interface, Battery Charge Control and Power Distribution in satellite constellations.</p>		
QUANTUM Beam Hopping Enabled Digital ASIC	<p>Control and management of RF subassemblies while enabling fast beam hopping in active array antenna</p>		
QUANTUM FPGAs	<p>Design, programming and verification of two space FPGAs according to ECSS-Q-60B standard</p>		
TMTC ASIC	<p>Mixed-signal ASIC for telemetry and telecommand handling for general purpose in satellites</p>		
RTG4 FPGAs	<p>Verification tools to corroborate good implementation of SEU/SET-Mitigation Techniques in 3rd/4th Generation Flash FPGAs.</p> <p>Validation of the effectiveness of these tools through Heavy Ion and proton radiation.</p>		

RAD-HARD IC PRODUCTS

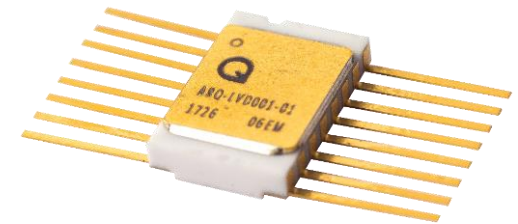
LVDS for SpaceWire networks

Data transmission along twisted pair cables at **very high data-rates** and **excellent EMI performance**

- ARQUIMEA LVDS family of ICs: **Driver, Receiver, Transceiver, Repeater**
- 0.25-um BiCMOS technology process. Fully European supply chain
- Full compliance with the ANSI_EIA/TIA644A standard
- **Over 500Mbps data transfer rate per channel**
- 3.3V single power supply
- Small propagation delay, low channel-to-channel skew and low jitter
- **Extended input common mode range** from -4V to +5V
- Cold-spare in all pins
- **Fail Safe protection**
- **Input hysteresis** implemented at the receiver side
- TID: 300 kRad(Si)
- SEL immune up to LET of 60 MeV*cm²/mg
- **BER down to 1E⁻¹³ err/bit in GEO orbit**
- **ESD protection above 8kV HBM**



LVDS Octal Repeater



LVDS Quad Driver

ECSS Qualification ongoing. FMs available in Q3-19

RAD-HARD IC PRODUCTS

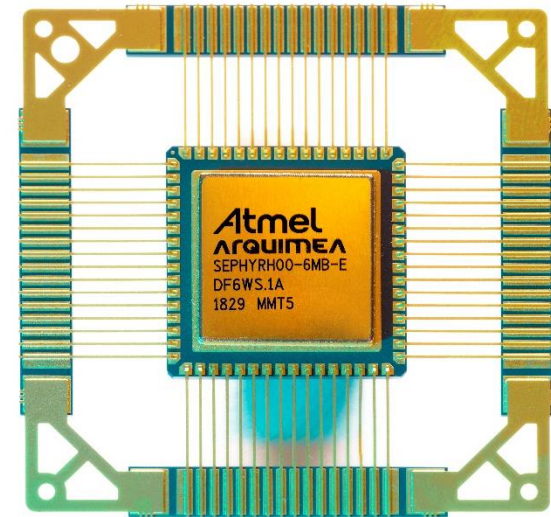
10/100 Mbps Ethernet PHY Transceiver

First rad-hard Ethernet PHY in the market

Standard solution for launchers, satellites and spacecraft

Compatible with **Time Sensitive Networks (TSN)** and **Time-Triggered Ethernet** for **deterministic real-time communications**

- **Compatible with IEEE 802.3 10BASE-T, IEEE 802.3 100BASE-TX and ANSI X3.263-1995**
- Integrated high performance 100 Mb/s clock recovery circuitry requiring no external filters
- Programmable loopback modes for easy system diagnostics
- 3.3V/1.8V power supply
- **Cold spare**
- MII/RMII MAC communication interface
- MI interface for MAC management and diagnostics
- TID > 100 kRad
- SEU threshold LET > 30MeV/mg/cm²
- SEU Error Rate < 10⁻¹² errors/bit-day (at < 70 MeV/mg/cm²)
- SEL immune up to LET of 60MeV/mg/cm²
- QFP64 package



Prototypes available. Seeking funding for ESCC qualification

RAD-HARD IC PRODUCTS

2.5 Gbps SERDES Transceiver

Used in **high-speed communications** to compensate for limited input/output.

Data transmission over a single line or a differential pair to **minimize the number of I/O pins and interconnects**.

- 1.6 to 2.5-Gbps transmission/reception speed
- Interfaces to backplane, copper cables or optical converters
- On-Chip 8-Bit/10-Bit Encoding/Decoding, Comma Detect
- Low Power: < 500mW (Power consumption < 5mW if the device is disabled)
- TID > 100 kRad
- SEU threshold LET > 30MeV/mg/cm²
- SEU Error Rate < 10⁻¹⁰ errors/bit-day (at <70 MeV/mg/cm²)
- SEL immune up to LET of 70MeV/mg/cm²
- BER < 10⁻¹² for GEO orbit
- Available in space-grade ceramic (CQFP68) and plastic packages

(*) Parameters to be confirmed

Under development. EMs available in Q3-19

RAD-HARD MICROELECTRONICS AND NEW SPACE

There are many alternatives open **for EEE Parts in New Space:**

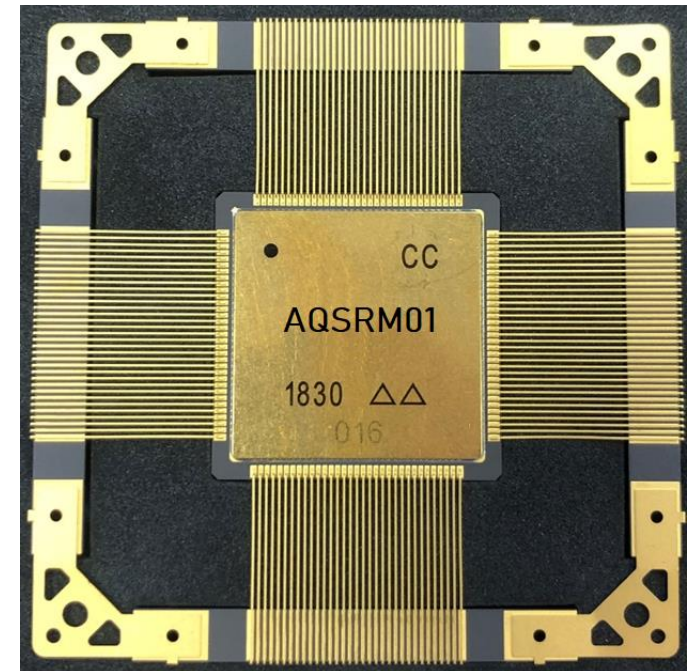
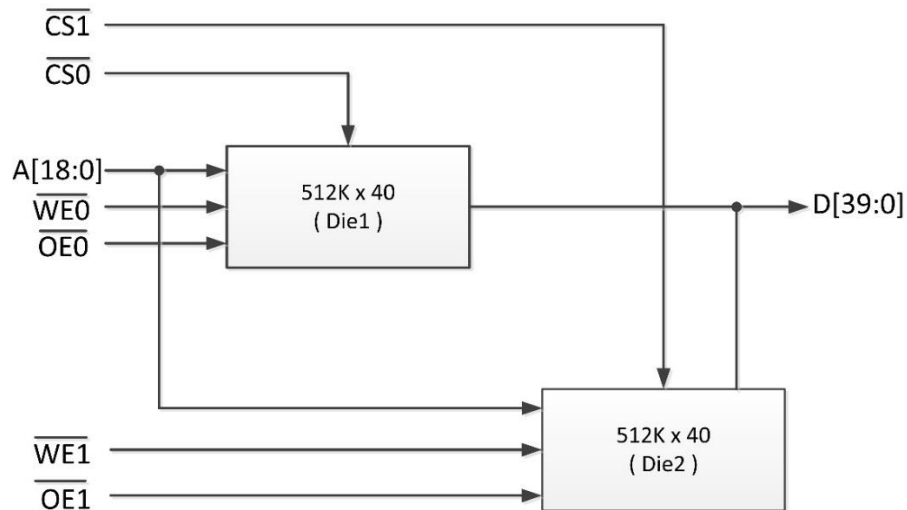
Radiation hardening → Up-screened COTS vs Rad Tolerant vs Rad Hard

Packaging → Ceramic vs hi-rel plastic

Qualification levels → ESCC vs reduced evaluation

We propose **Chinese flight-proven parts with independent reduced ESCC evaluation at very competitive prices:**

First use case → Rad-hard 40Mb CMOS SRAM



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Adrien Frouin

Senior Product Manager

afrouin@arquimea.com

+34 637 003 887

www.arquimea.com