

The most important thing we build is trust



ADVANCED ELECTRONIC SOLUTIONS

AVIATION SERVICES

COMMUNICATIONS AND CONNECTIVITY

MISSION SYSTEMS

## Designing Products with the DARE 180 Library

Sandi Habinc, Cobham Gaisler AB

Dare User Day, 8 December 2014

COBHAM

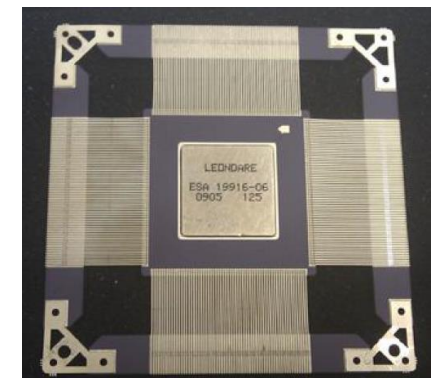
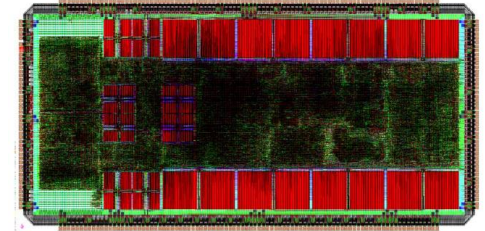
RACE PARTNER

VOLVO  
OCEAN  
RACE  
ROUND THE WORLD

# GR704 – LEON3FT with SpaceWire and CAN

ESA activity, LEONDARE development with TAS-B and IMEC

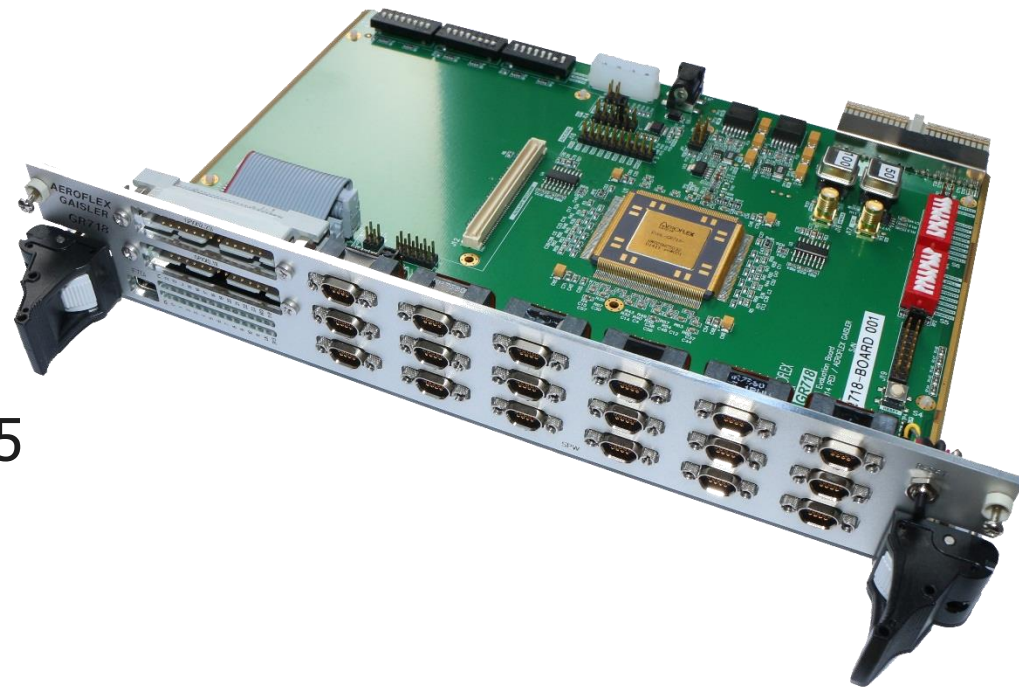
- LEON3-FT SPARC V8 32-bit Integer Unit
- GRFPU-FT IEEE-754 Floating Point Unit
- Debug Support Unit with UART Debug Link
- SPARC Reference Memory Management Unit (MMU-FT)
- Memory controller with EDAC: PROM/SRAM/SDRAM/I/O
- Timer unit with 32-bit timers and watchdog
- Interrupt controller for 15 interrupts in two priority levels
- 2 x UARTs with FIFO and separate baud rate generators
- 16-bit general purpose input output port
- 2 x SpaceWire links with full RMAP support
- CAN 2.0 controller with DMA support
- 256-pin Ceramic Quad Flat Package with 164 I/O





# GR718 – 18 port SpaceWire Router

- Draft GR718 data sheet and user manual ready (v1.7)
- Draft GR718-BOARD users manual ready (rev 1.0)
- We take orders for prototypes at this stage
  - GR718-CP-CQ256
  - GR718-BOARD
- Boxed version in planning
- Follow on qualification activity under ECI funding to be started in January 2015



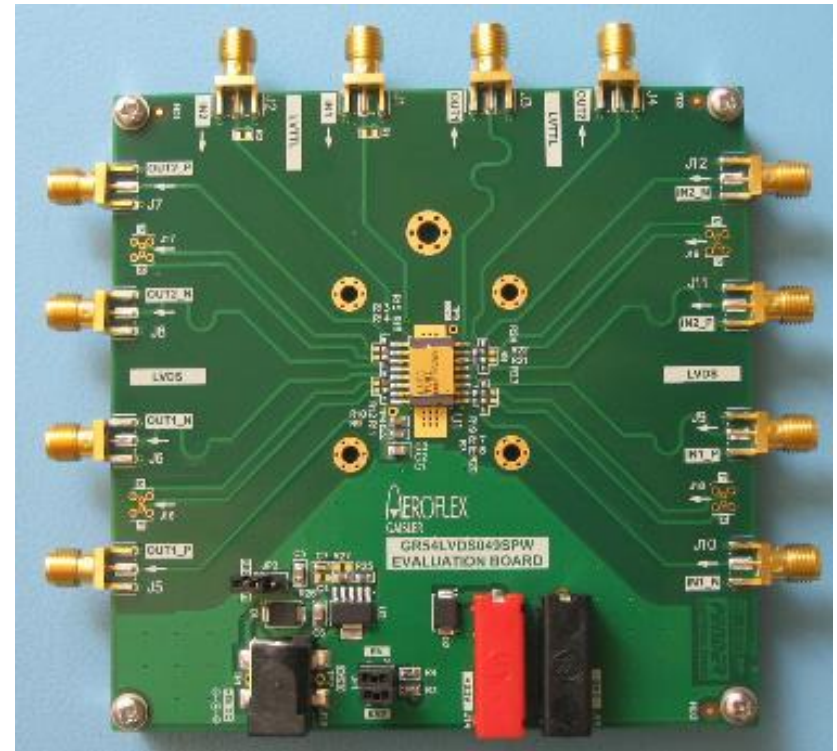
- ESA Contract (ECI phase 3)
- Development in three phases:
  - Definition and preliminary design
  - Design, prototype manufacture, test (current)
  - ECSS qualification
- Development and ESCC Qualification of 2 LVDS ICs:
  - Dual Transceiver, 16 pin (type: National Semi. DS90LV049Q)
  - 4x4 Cross-Point Switch, 40 pin (type: Texas Inst. SN65LVDS125a)
- Based on technologies & companies with space heritage
- Rad Hard CMOS
- Hermetic sealed ceramic flat package
- ESCC assembly and test



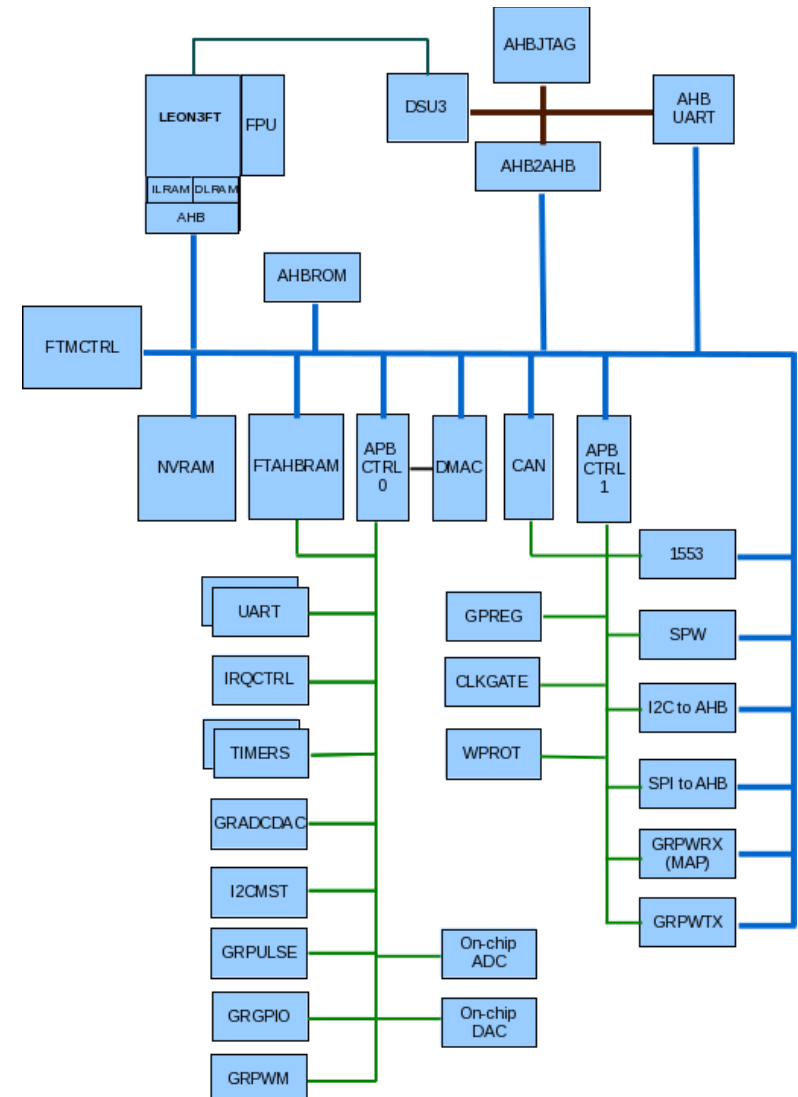
# European LVDS transceiver development

ESA activity with IMEC

- TIA/EIA-644 compliant LVDS inputs and outputs
- Up to 400 Mbps switching rates
- 3.3V single supply
  - 3.3V LVTTTL compatible input / output
  - 5V tolerant TTL inputs
- Overvoltage tolerant (transients)
  - Supply: -0.5V / 4.6V
  - LVTTTL: -1V / +6V
  - LVDS: -5V / 6V
- ESD robustness - 8 kV HBM ESD Level
- Radiation performance
  - TID hard > 300 krad(Si)
  - SEL immune > 118 MeV-cm<sup>2</sup>/mg
  - SEU/SET immune > 80 MeV-cm<sup>2</sup>/mg
- Receiver Extended Common Mode Input: -4V / +5V
- Receiver with Active Failsafe Operation
- Cold Spare outputs



- LEON3FT with 16-bit instruction set
- Floating-Point Unit
- SpaceWire, SPI, I2C, 1553, etc.
- Deterministic software execution
  - Through local processor RAMs
  - Non-intrusive debugging
  - Reduced interrupt latency
- Fault-tolerance
  - EDAC on all on-chip memories
  - EDAC on external memory i/f
- Die area: 10x10 mm<sup>2</sup>
- Maximum pin count: 100 pins
  - Requires pin sharing/multiplexing
  - IO switch matrix



**Sixth International Workshop on  
Analogue and Mixed-signal Integrated Circuits  
for Space Applications**

**AMICSA 2016  
Gothenburg, Sweden**



**City of  
Gothenburg**