



AT7913 Spacewire RTC

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Aerospace BU

Nicolas GANRY
nicolas.ganry@atmel.com



ATMEL SPARC V7 / V8 Flight Heritage

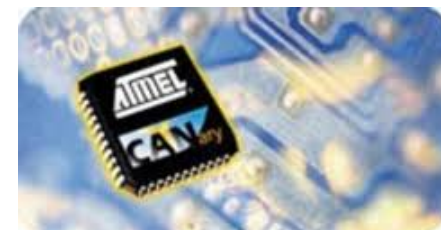
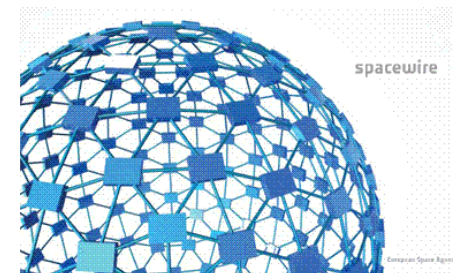
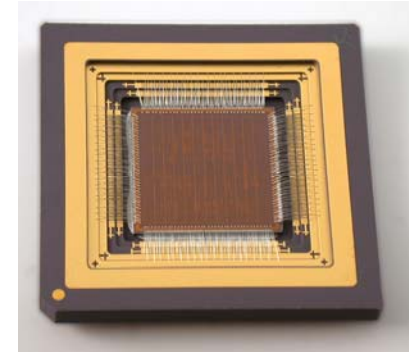


- Unique Flight Heritage
 - SPARC V7 TSC695
 - More than 3000 flight models already delivered, since 2003
 - SPARC V8 AT697 (100MHz) starting stronger than TSC695 from the end of 2010
 - AT697E 150 FM delivered
 - AT697F 50 FM delivered reaching 250 by the end of 2012
 - Preparing the future with a 200MHz Processors with more peripherals and DDR memory interface
- Atmel Processors SPARC V7 and V8 are used worldwide



AT7913 Spacewire Remote Terminal Controller

- SPARC V8 Processor - LEON2-FT 50Mhz
 - 4K instruction cache, 4K data cache
- Package CQFP 352 or MCGA 349
- Highly integrated peripherals
 - Digital ADC/DAC
 - Redundant CAN 2.0 with DMA
 - FIFO interface with DMA
- Spacewire
 - 2 links with RMAP
 - LVDS
 - Up to 200Mbit/s data rate
- Onchip Memory 64KBytes EDAC protected
- Radiation
 - Tested up to 300Krad
 - No single event latchup below LET 80 MeV/mg/cm²
- Operating range
 - 3.3V +/- 0.30V for I/O
 - 1.8V +/- 0.15V for Core
 - -55°C to 125°C
- QML-Q, QML-V and RHA grade



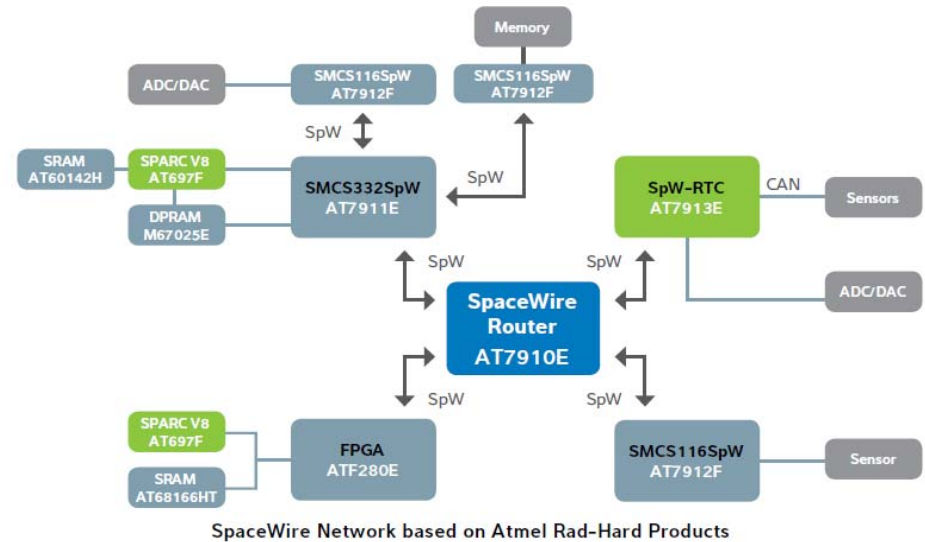
AT7913 Targeted Application & Values

Powerfull Processor integrating most used Space interfaces :

ADC/DAC interface for analogue acquisition/conversion

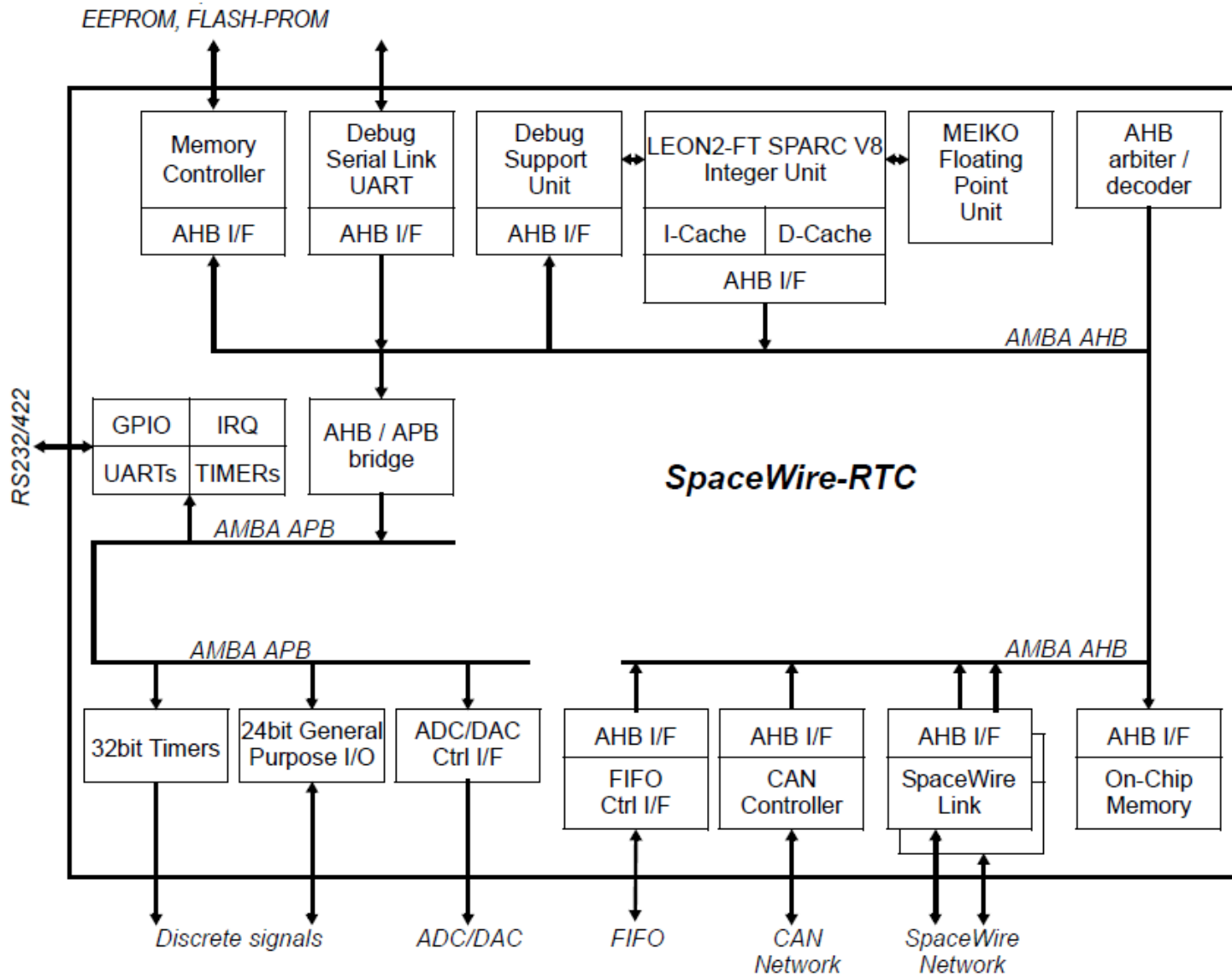
CAN instrumenting control

Spacewire enables bridging of traffic from sensor onto high speed network

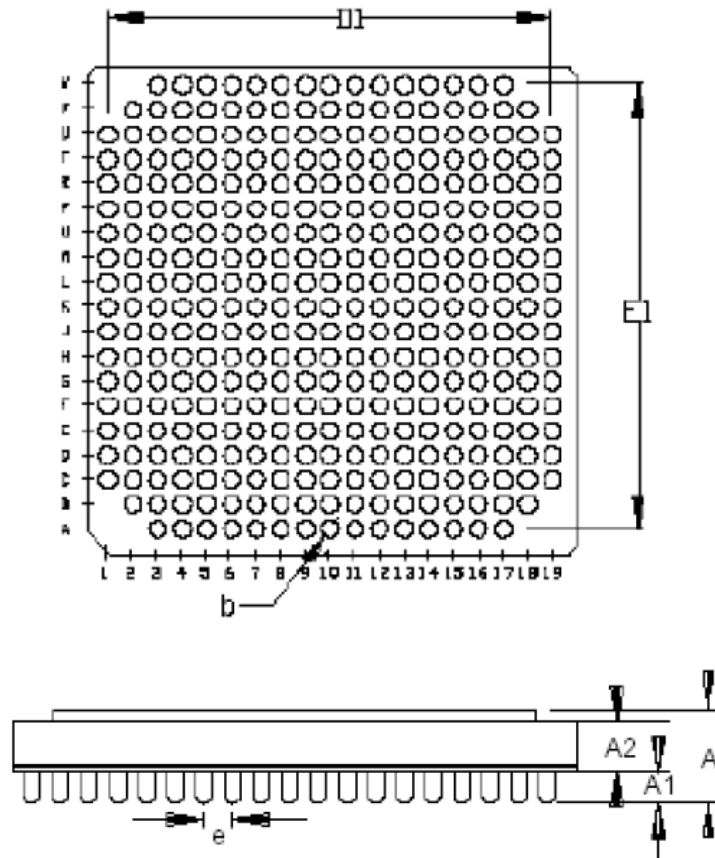


- Radiation Hardened and Flight heritage from ASIC ATMEL ATC18RHA technology
- Reuse Software development & System maturity from proven SPARC V8 LEON architecture
 - More Hardware integration on board :
 - lower power consumption and reduced weight

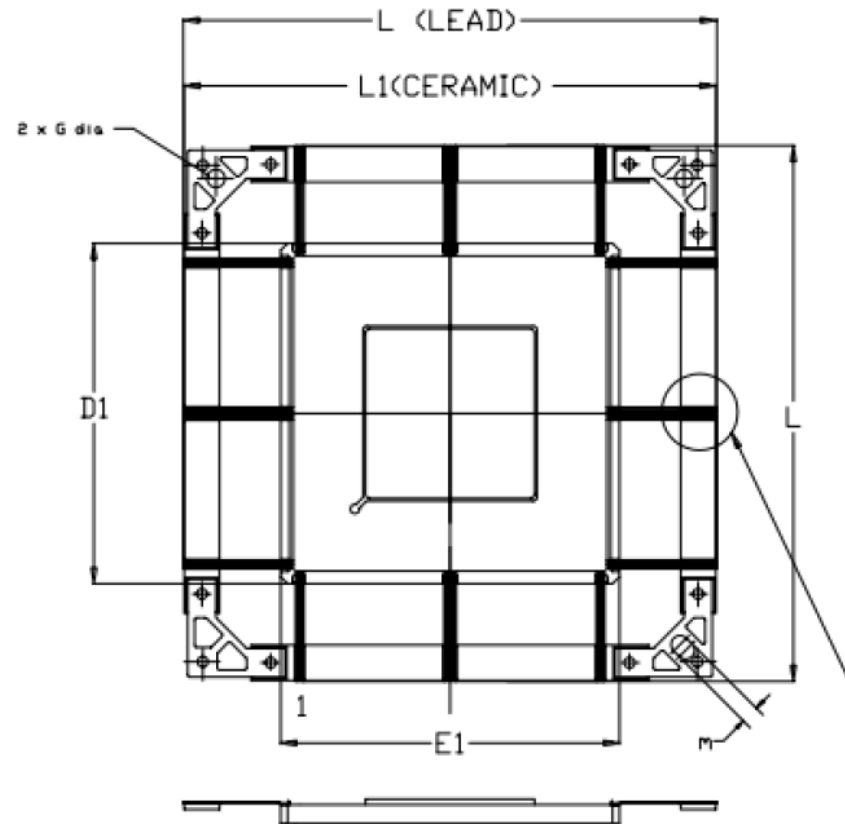
AT7913 Block Diagram



AT7913 Packaging



MCGA349 24x24



CQFPT352 48x48

AT7913 Schedule

| Delivery | Content | Schedule |
|---------------|--|-----------|
| Prototype | Engineering Samples for Prototype Release datasheet | Available |
| Flight Model | QML like models Product Specification | Available |
| Certification | QMLQ/QMLV Flight models SMD | Available |

AT7913 Services for Development

Documentation

- Datasheet
- User Guide

| SIGNAL | LEAD | SIGNAL | LEAD | SIGNAL | LEAD | SIGNAL | LEAD |
|---------------|------|-------------|------|---------------|------|---------------|------|
| | | VSA6 | B2 | VDAS | C1 | VSA10 | D1 |
| VDA4 | A3 | VDAS | B3 | VDAS | C2 | VSA4 | D2 |
| VSA4 | A4 | VDAS | B4 | CanTx_0 | C4 | CanEn_1 | D4 |
| CanTx_1 | A5 | VSB3 | B5 | Gpio_22 | C5 | CanRx_0 | D5 |
| Gpio_19 | A6 | Gpio_23 | B6 | Gpio_16 | C6 | Gpio_21 | D6 |
| Gpio_13 | A7 | Gpio_15 | B7 | Gpio_10 | C7 | Gpio_17 | D7 |
| VCE2 | A8 | Gpio_7 | B8 | | C8 | Gpio_9 | D8 |
| Gpio_0 | A9 | Gpio_1 | B9 | Gpio_2 | C9 | Gpio_3 | D9 |
| SpwCk10Mbps_0 | A10 | TapTdo | B10 | TapTms | C10 | SpwCk10Mbps_2 | D10 |
| SpwStn_P_0 | A11 | SpwCln_P_0 | B11 | SpwCln_N_0 | C11 | LvsRst0 | D11 |
| SpwSOut_P_0 | A12 | SpwCOut_P_0 | B12 | SpwCln_N_0 | C12 | VSB0 | D12 |
| SpwCkPrcnfg_1 | A13 | SpwCkSrc | B13 | | C13 | SpwCkAut0 | D13 |
| PvDCPL | A14 | IsCln | B14 | SpwCkPrcnfg_0 | C14 | MemRst0 | D14 |
| IsWn | A15 | | B15 | | C15 | IsRead | D15 |
| VSA5 | A16 | VSA7 | B16 | ICnN | C16 | IsRdyN | D16 |
| VDA5 | A17 | VDA3 | B17 | VSA9 | C17 | VSB0 | D17 |
| | | VSA3 | B18 | VDA10 | C18 | MemR_1 | D18 |
| | | | | VDA11 | C19 | VSA11 | D19 |

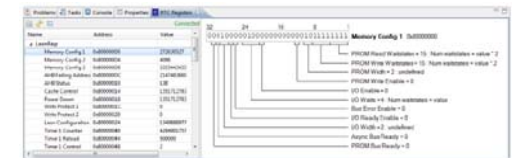
HW Demonstrator

- AT7913 Hardware Development Kit



SW & Tools

- SW demonstration
- SW for debug – SDE



AT7913 Hardware Development Kit



Hardware Specifications

Size:

- 220mm wide, 30mm high (excl. feet), 115mm deep (approx.).

Power:

- +5V DC, power brick supplied.

USB 2.0:

- High Speed 480 Mbits/s.

SpaceWire Ports:

- ECSS-E50-12A and ECSS-E-ST-50-12C compliant.
- Maximum Speed: 200 Mbits/s.

Trigger input and output ports:

- SMB connectors: +3.3V signal, 5V tolerant.

CAN Ports:

- CAN 2.0B Protocol.
- Configurable Normal End Node or Stub Node modes.

UART RS-232 Port:

- Configurable DSU-UART mode or processor peripheral UART mode.

On-Board ADC and DAC:

- Four channel Analogue inputs to ADC – AD774B.
- One channel Analogue output from DAC –AD667.

On-Board Memory:

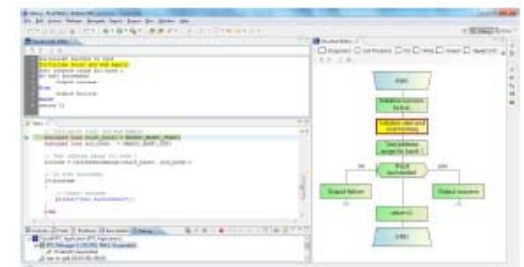
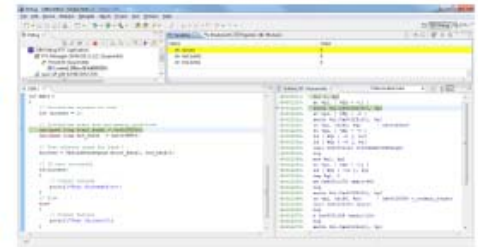
- Up to 160Mbits SRAM (config. as -8bit, -32bit or -40bit bus).
- Up to 160Mbits FLASH (config. as -8bit, -32bit or -40bit bus).

Expansion Connectors:

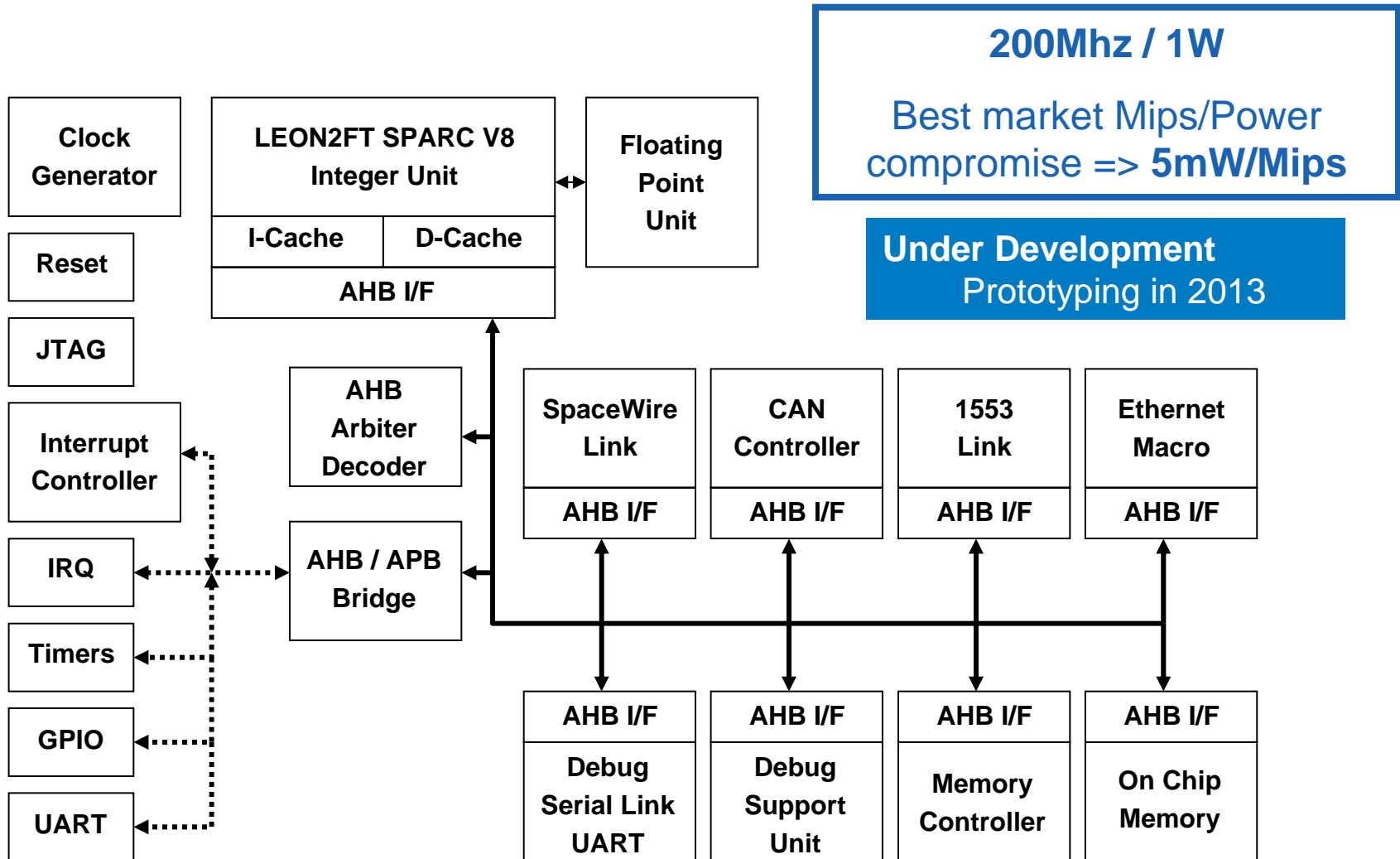
- ADC and DAC expansion connector.
- FIFO expansion connector.
- LEON PIO & GPIO expansion connector.

AT7913 Software Development Environment

- ATMEL proposing a comprehensive, fully integrated set of software development tools developed by Stardundee.
- <http://www.star-dundee.com/products>
- This SDE (Software Development Environment) includes the following services :
 - Compiler
 - GNU Compiler Collection fully integrated tool chain
 - Debugger
 - Eclipse IDE widely adopted Integrated Development Environment
 - Plugins for Eclipse IDE for seamless access to peripherals & components
 - Hardware interface module to manage communication w Eclipse IDE
 - Monitor
 - Code Rocket
 - => abstract pictorial and descriptive input tool



CASTOR – Specifications SPARC V8 200MHz



THANK YOU

