

CAN: Integrating Soft IP Cores Into Rad-Hard Products

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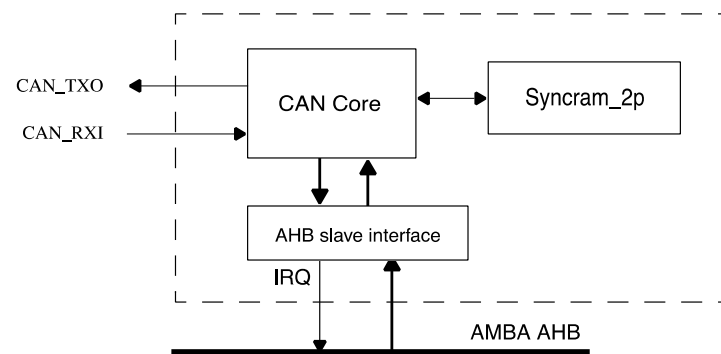
2013 October 23

- ▼ **IP cores**
- ▼ **Development boards**
- ▼ **Development systems**
- ▼ **SoC and companion device components**
- ▼ **Customized system-on-chip solutions**
 - **Microcontroller/processors, companion devices**
- ▼ **Software drivers**

IP Cores

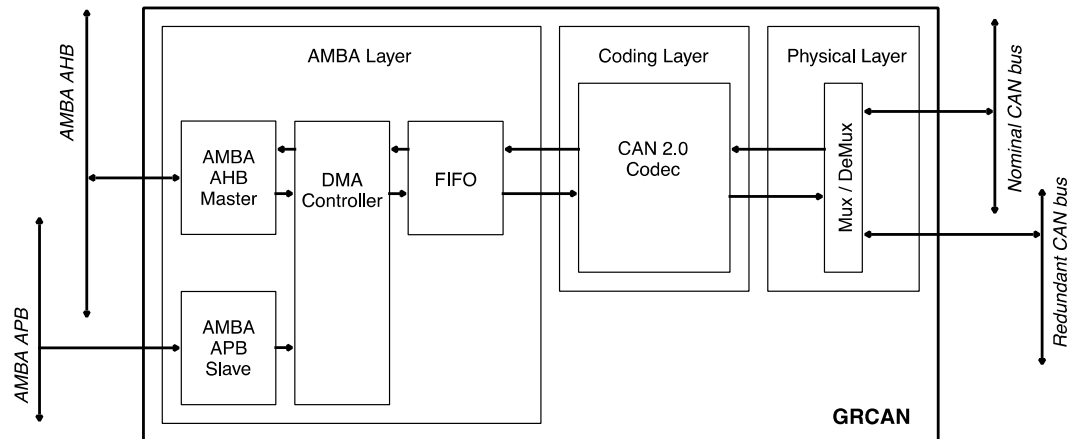
▼ CAN_OC

- Based on Philips SJA1000 and has a compatible register map with a few exceptions.
- Attached as slave to on-chip bus, controlled via register interface
- 20 – 1000 kbps bitrate
- CAN 2.0B with standard and extended frame format
- Message filtering
- 64 byte receive FIFO
- Optional single-shot transmission



▼ GRCAN

- Same features as previous core, plus:

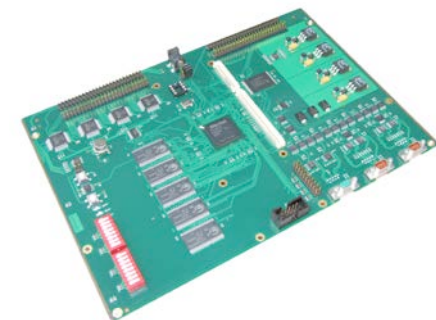
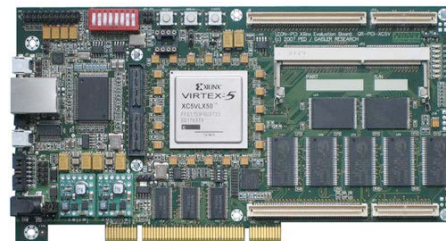
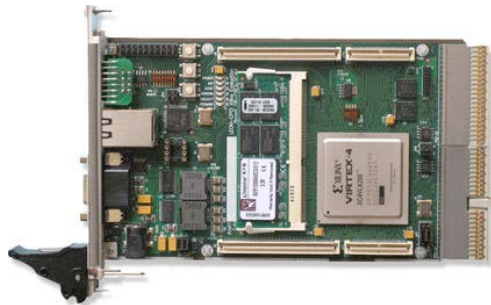
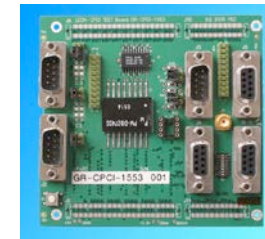


- **DMA using circular buffer of configurable size**
- **AMBA 2.0 master, AMBA APB slave interface used for configuration**
- **GRHCAN: Makes use of ESA HurriCANe CAN controller**

Development boards

▼ FPGA development boards with CAN transceiver(s)

- GR-CPCI-XC4V (via mezzanine)
- GR-PCI-XC5V (via mezzanine)
- GR-CPCI-AX (via mezzanine)
- GR-MCC-C



Development systems

Development system: RASTA



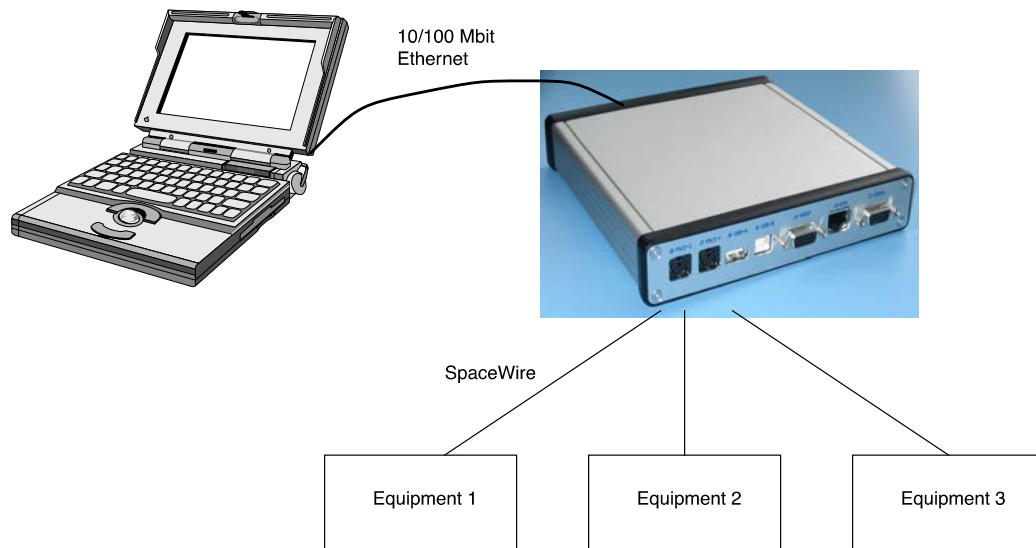
▼ RASTA: LEON2/3 systems with CAN 2.0

Board	GR-CPCI-AT697	GR-CPCI-XC4V	GR-CPCI-AX200	GR-CPCI-XC4V	GR-CPCI-XC4V	GR-CPCI-XC4V	GR-CPCI-AX200	GR-CPCI-XC4V	GR-CPCI-R5232
Processor	LEON2	LEON3	LEON3	LEON2	LEON3				
Slots	1 slot	1 slot	1 slot	4 slots	4 slots	4 slots	4 slots	2 slots	1 slot
GR-RASTA-101	X						X		X
GR-RASTA-102	X						X	X	X
GR-RASTA-103	X						X		X
GR-RASTA-104	X						X	X	X
GR-RASTA-105					X				X
GR-RASTA-106				X					X
GR-RASTA-107		X					X		X
GR-RASTA-108		X					X	X	X
GR-RASTA-109			X				X		X
GR-RASTA-110			X				X	X	X



▼ GRESB: Ethernet-to-SpaceWire bridge

- Optional feature: CAN 2.0B interface



New!
GRESB2 with 10/100/1000
Mbit Ethernet

- **API to communicate through Ethernet-CAN bridge delivered with GRESB**

Components

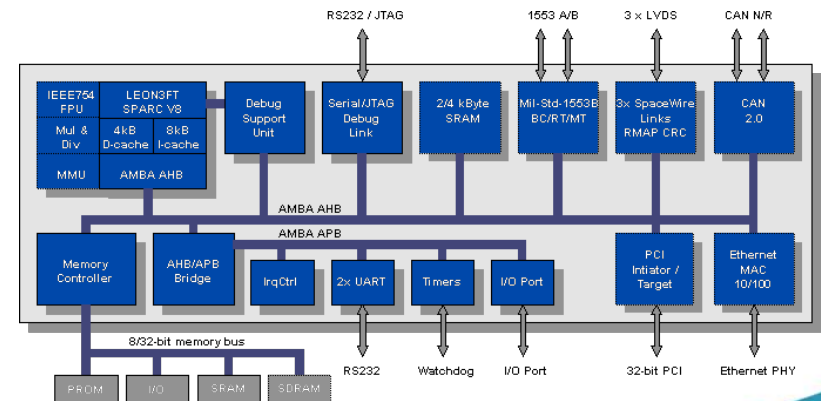
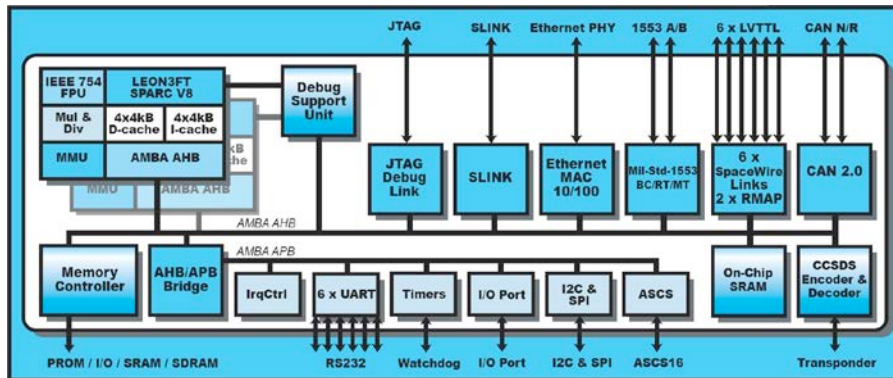
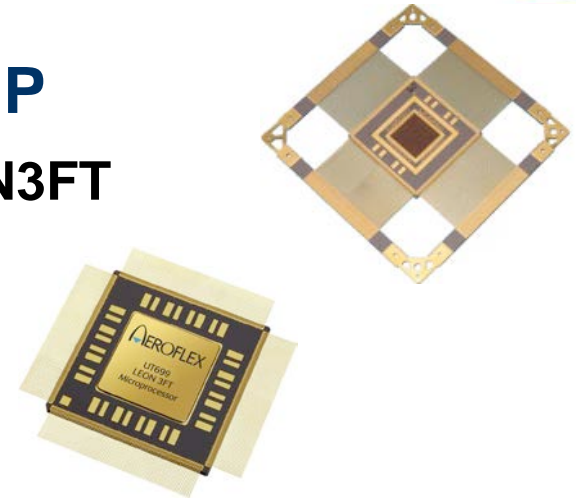
Components with CAN bus



▼ Microprocessors with proven IP

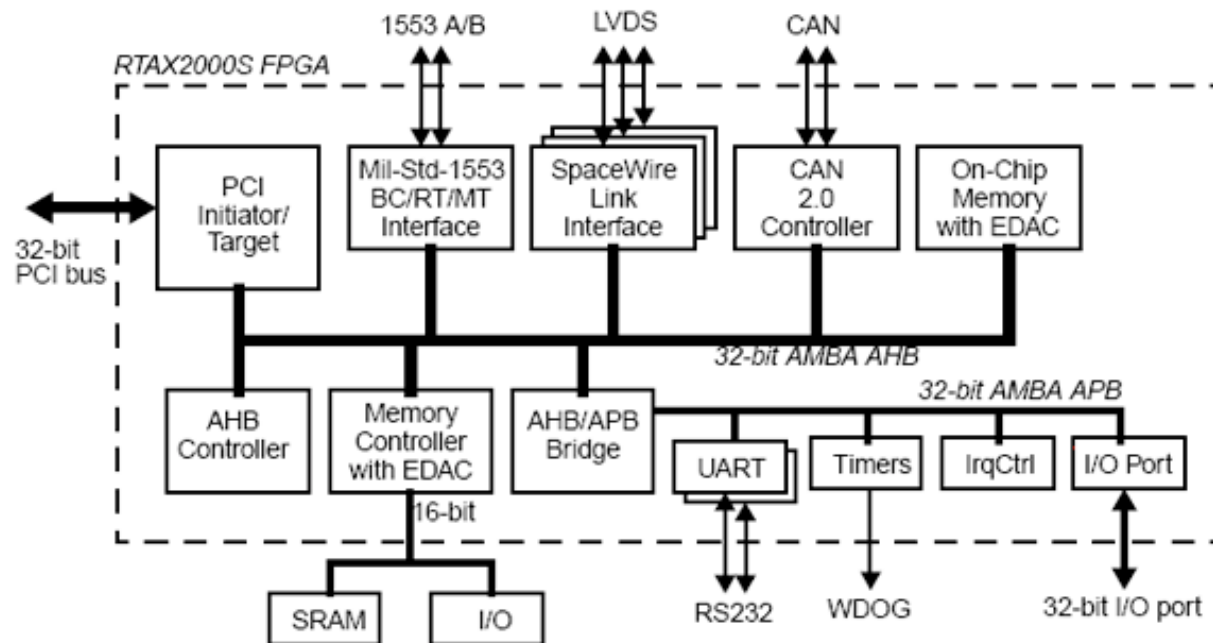
- GR712RC – Dual processor LEON3FT
- UT699/UT699e/UT700

- LEON3FT-RTAX
- LEON3FT-RT3PE



▼ GR701

- PCI to SpaceWire/1553/CAN bridge
- Companion device to UT699, AT697 and other systems with PCI interface



Custom solutions

- ▼ **Aeroflex Gaisler provides customized configurations of**
 - LEON3FT-RTAX
 - LEON3FT-RT3PE
 - GR701

- ▼ **Other customized solutions also possible, selection of services available:**
 - Delivery of programmed components
 - Delivery of programming files
 - Delivery of top-level design together with GRLIB IP Library
 - IP core delivery

Software

- ▼ **Software drivers available for**
 - RTEMS 4.10
 - WindRiver VxWorks 6.7
 - Linux 3.x
- ▼ **CAN controller simulation models available in TSIM simulator. GRSIM CAN model planned.**
- ▼ **All components based on same proven IP**
 - IP core used for GR712RC, UT699, LEON3FT-RTAX, ..., can be licensed for use in custom developments

- ▼ **Several flight-ready components already support the CAN bus**
- ▼ **Aeroflex Gaisler provides everything from soft IP cores to rad-hard flight components**
- ▼ **CAN IP cores used in GR712RC, UT699, AT9713E, ...**
- ▼ **CAN controllers continue to be included in current projects**
- ▼ **IP will be extended to support new developments**
 - **CAN-FD**
 - **Processor offload**

Thank you!

▼ Additional information:

- GR712RC, LEON3-RTAX/RT3PE, GRESB, RASTA:

- ▼ <http://www.gaisler.com>

- UT699/UT699e/UT700

- ▼ <http://www.aeroflex.com>

- IP core documentation

- ▼ **GRLIB IP Core User's Manual**

- ▼ <http://www.gaisler.com>

▼ Inquiries:

- sales@gaisler.com