V8UC: A NEW SPARC V8 MICROCONTROLLER CORE DERIVED FROM LEON2FT

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LEON Microcontroller is a new development that starts from the ESA LEON2-FT core to realize a lite Sparc V8 microcontroller (V8uC) device for space missions. V8uC targets the satellite subsystem embedded applications where the full Leon2-FT features, with its size and cost, exceed the effective requirements.
In the V8uC design the LEON2-FT pipeline is reused without changes but the large caches/AHB/memory interface system is replaced by a simple memory and I/O space controller capable to manage on-chip and off-chip memories.
In the project a special effort is spent to reduce the timing and the risks due to the SW development on a new device. SW/HW backwards compatibility is mainly maintained and an additional debugging support is provided.
V8uC embodies a simplified version of the LEON2-FT DSU module to keep the compatibility with the GRMON family tools. In addition, V8uC is going to be equipped with all the SW stuff (stub file and communication functions) needed to interface it directly to the GDB GNU debugger through any standard serial link.
The HW Sparc V8 ISA compatibility is assured by the unchanged pipeline reuse. The LEON2-FT peripherals set is maintained keeping the previous register interface. Furthermore each module is enriched with additional functionalities:

- New USART module supports also SPI and PacketWire protocol
- TIMERS may works as programmable PWMs
- A wake-up manager will allow to put the PipeLine and all peripherals independently into sleep mode

The feasibility/opportunity of including further features suitable for embedded space applications, like DAC/ADC interface, event manager or DMA channels, is actually under study and more details shall be furnished during presentation, as also a comparative matrix giving evidence of the V8uC versus the LEON2-FT resource/cost saving depending on the different options.