SCR
8-Bit Standby Controller
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Key Features

16-bit General Purpose Timer
Real Time Clock (RTC)
Power Saving Modes

Customer Benefits

Digital signal generation
Periodic wake-up in standby mode
Various power saving techniques can be implemented

Highlights

› The SCR is an 8-bit microcontroller that can continue to run during the standby mode.
› It is based on the XC800 core, which is compatible with the industry standard 8051 processor.
› The microcontroller has an embedded 8 KB XRAM for program code and data.
One of the features of the SCR is the 16-bit T2CCU, which contains three timers: Timer 0, Timer 1:

- Timer or counter operation
- 16-bit auto-reload mode
- Selectable up or down counting

Additionally, a 6-channel Capture/Compare Unit is included:

- 16-bit resolution
- Six compare channels
- Four capture channels

The timers can be used for digital signal generation or periodic interrupt generation, ensuring high flexibility of the module.
One of the SCR’s peripherals is the Real Time Clock (RTC), which, once started, can work independently of the state of the rest of the microcontroller.

The Real Time Clock (RTC) with the on-chip oscillator support the periodic wake-up in standby mode.

The periodic Wake-up Mode is using either the 70 kHz clock or the 100 MHz /DIV clock.
The different Power Saving Modes ensure a very flexible configuration, using either the idle mode or the clock gating control to each peripheral.

With only one silicon, two separate core domains are supported:

- A “high performance” domain (TriCore™): this is needed for example, only when the engine is on
- A “low power” domain (SCR):
  - It is permanently on
  - All features needed for supervising tasks are available
  - Wake-up of high performance domain can be done only when needed (e.g. when the car is started)
The SCR is connected to multiple modules of the AURIX™ microcontroller:

- Power Management System: it controls the changes between different power domains
- Interrupt Router: it triggers different interrupt signals
- Clock Control Unit: it selects the correct clock source
- Reset Control Unit: it ensures that the SCR receives the request for reset
- Debug: SCR has its own debug interface separately from the AURIX™, which allows parallel debugging of both TriCore™ and SCR
- Port Pins: the timers contained in SCR can generate digital signals on these port pins
Application example
RTC with GPIO read and TriCore™ wake-up

› The microcontroller shall perform periodic communication with external components through one of the LIN channels (up to 30 channels).

› The system receives a communication request for the channel through a change in the logical state on one of the TX lines.

› The system respond time for the communication shall not exceed 200 ms and the system current in this mode shall not exceed 7 mA, given the total budget of the microcontroller average current of 5 mA.

› The standby mode together with the total amount of pins (the high-end devices have a total amount of 16 pins) fits all the requirements:
  - The periodic wake-up of the TriCore™ cluster in a minimal configuration can take place in order to acquire the necessary amount of signals.
  - Even though the TriCore™ domain requires a relatively high current, the average current remains low since most of the time only the SCR with a minimum functionality remains active.
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