

SCR

8-Bit Standby Controller

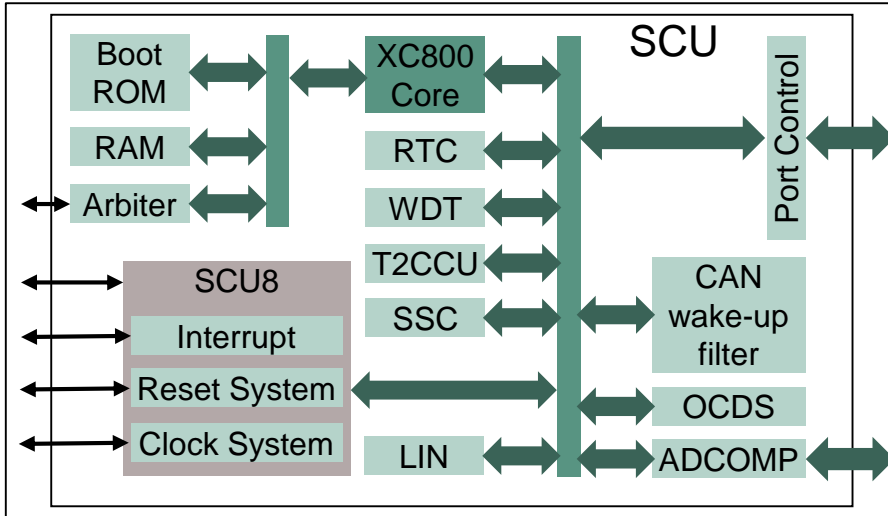
AURIX™ TC3xx Microcontroller Training
V1.0 2020-12



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SCR

8-Bit Standby Controller



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.

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

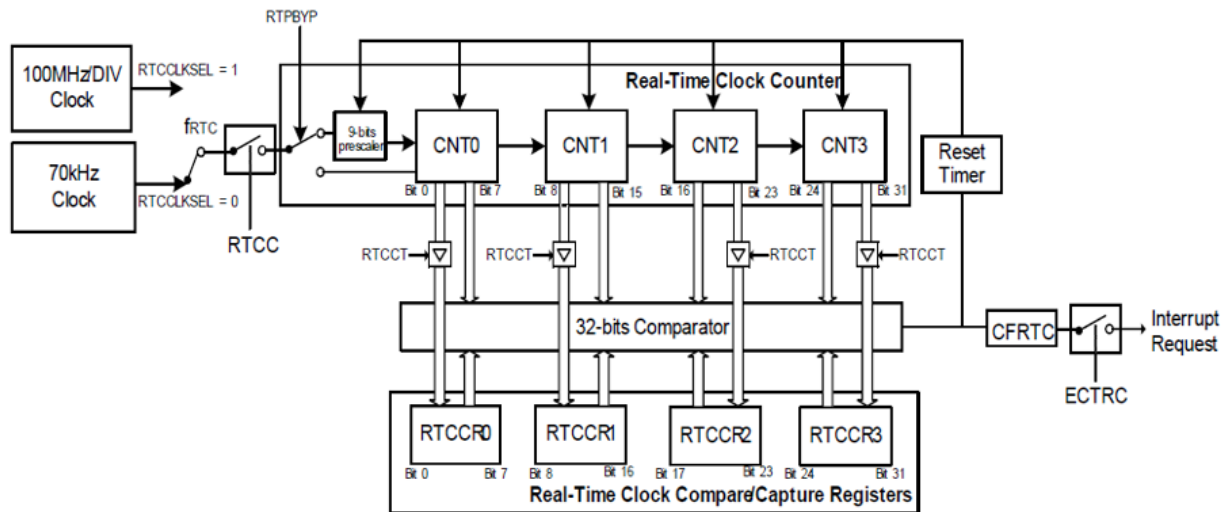
16-bit General Purpose Timer

- › 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.

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Real Time Clock (RTC)

- › 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.



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Power Saving Modes

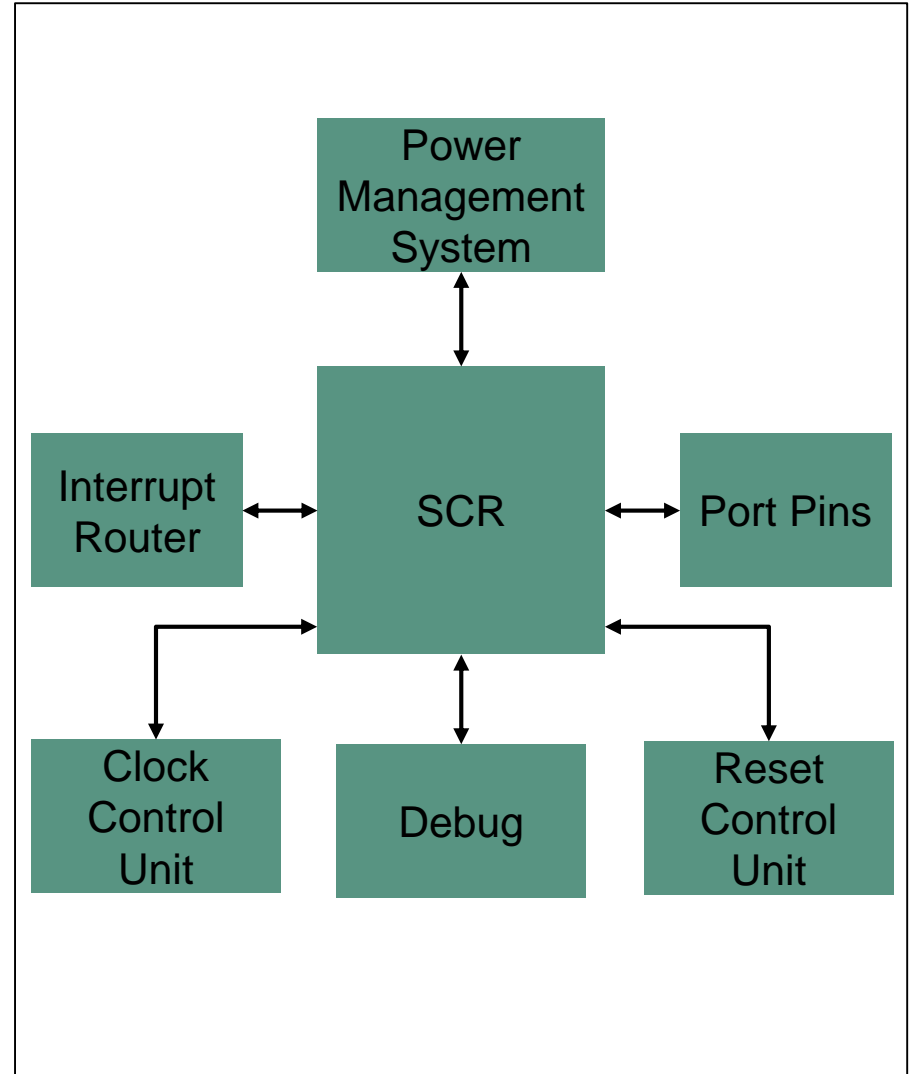


- › The different Power Saving Modes ensure a very flexible configuration, using either the idle mode or the clock gating control to each peripheral.
- › With only one silicon, two separate core domains are supported:
 - A “high performance” domain (TriCore™): this is needed for example, only when the 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)

SCR

System integration

- › 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



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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