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Proteus VSM for ARM® Cortex™-M4

System Level Simulation for ARM® Cortex™-M4 Variants.

Summary

Proteus Virtual System Modelling (VSM) combines mixed mode SPICE circuit simulation, animated components and microprocessor models to facilitate co-simulation of complete microcontroller based designs.The 'Proteus VSM for ARM® Cortex™-M4' product includes the following main software modules:

- Professional Schematic Capture module

- ProSPICE professional Simulation Engine

- All supported VSM microcotroller variants in the ARM® Cortex™-M4 Family.

- All of the Proteus Embedded Simulation Peripheral Libraries.

- VSM Studio IDE with automatic compiler configuration.

- Over 10,000 standard simulation models.

⚠ *Proteus VSM for ARM Bundle products are ideal if you need to simulate more than one family of ARM micro-controllers.*

Variants

The following is a current list of supported variants in the ARM® Cortex™-M4 family:

- STM32F401CB, STM32F401CC, STM32F401CD, STM32F401CE

- STM32F401VB, STM32F401VC, STM32F401VD, STM32F401VE

- STM32F401RB, STM32F401RC, STM32F401RD, STM32F401RE

Features

We believe our simulation models are the most accurate and the most complete on the market today. A summary of model capabilities is listed below:

- Fully simulates the entire instruction set (excluding operations for multiprocessor support).
- Fully simulates FPU instruction set.
- Supports all port and other I/O pin operations.
- Supports powerdown modes.
- Supports Window Watchdog Timer and Independent Watchdog Timer.
- Supports General Purpose Timers (TIM1, TIM2-TIM5, TIM9-TIM11) in all modes.
- Supports Real-time Clock.
- Supports I2C with multimaster capability and packet error checking.
- Supports SPI with Texas Instruments frame type and hardware CRC calculation.
- Supports USART with full duplex asynchronous communication
- Supports 12-bit ADC with several input channels, all conversion modes and configurable resolution.
- Supports internal code and data FLASH memory including Cortex-M4 memory region protection.
- Supports Universal Serial Bus on-the-go full speed (USB-OTG_FS) in device mode.
- Supports all interrupt modes.
- Provides internal consistency checks on code (e.g. execution of invalid op-codes, illegal memory accesses, stack integrity checking, etc.).
- Fully integrated in to the VSM source level debugging system.
- Fully integrated into the Proteus Diagnostic Control System.

Limitations

The following is a listing of known limitations in the current version of the ARM® Cortex™-M4:

- x Clock security system is not implemented.
- x SPI doesn't support IrDA and I2S audio protocols
- x I2C::TRISE is not implemented
- x I2C doesn't support SMBus protocol
- x Tamper detection and backup functionality are not implemented
- x Flash programming algorithm is not implemented.
- x USB OTG Host capabilities and HNP protocol are not implemented.
- x RTC doesn't perform reference clock detection
- x RTC doesn't support calibration (RTC_CALR register)
- x SDIO is not implemented
- x Pins VCAP_1 and VCAP_2 are not modeled
- x USART doesn't support Smartcard, LIN, IrDA protocols

Compilers

Supported Third Party Compilers

Proteus VSM models will fundamentally work with the exact same HEX file as you would program the physical device with. However, far more debugging information is available when using a compiler to write the firmware and providing these object files to Proteus in place of the HEX file provides a much richer working environment.

We recommend you use the free Labcenter VSM Studio IDE. This will greatly simplify the task as it will automatically configure supported compilers to work with a Proteus VSM simulation.

If you prefer to work inside your own IDE then you will need to set your compiler options manually. After compiling for debug, all you need to do is specify the debug file from the compiler as the program property of the microcontroller on the schematic.

VSM Studio supported toolchains

- GCC