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- **Included in Code Composer Studio™ Integrated Development Environment (IDE) for TMS320C2000™**
- **TMS320C28x™ CPU Full Instruction Set Architecture Execution**
  - **Parallel Instruction Execution**
- **TMS320C28x Can be Simulated With the Following Peripherals:**
  - **Peripheral Interrupt Expansion (PIE)**
  - **VBUS**
  - **Timer**
  - **FLASH memory**
- **Configurable Memory Simulation**
- **Accurate Cycle Simulation**
  - **On-Chip Memory Blocks**
  - **External Memory Blocks**
- **Port Connect**
  - **Supports External Data Simulation**
- **Pin Connect**
  - **Supports External Event Simulation**
- **Supports Pipeline Display**

Description

The TMS320C28x Instruction Set Simulator, available within the Code Composer Studio for TMS320C2000 IDE, simulates the instruction set of the C28x™ core. Table 1 lists the simulator cores and peripherals supported, with the corresponding configuration to be selected under the Import Configuration menu of Code Composer Studio Setup.

Table 1. Processors Supported by the C28x Simulator

PROCESSOR	CODE COMPOSER STUDIO IDE IMPORT CONFIGURATION
TMS320F2810	F2810 Device Simulator
TMS320F2812	F2812 Device Simulator
TMS320F28x (CPU only, no peripherals)	F28xx Cycle Accurate Simulator
TMS320F2810 and TMS320F2812 tutorial	F28xx Simulator Tutorial

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Supported Hardware Resources

CPU

The C28x simulator simulates the full C28x instruction set architecture (except emulation instructions).

Memory

The simulator provides configurable memory simulation. By default, the simulator does not provide any memory mapping specific to the device or processor. All the memory blocks in Program, Data, and I/O space can be simulated by adding memory blocks using the simulator configuration file. The memory blocks can also be added using the "Memory Map Add" feature in GEL for debugger visibility.

The simulator provides cycle accurate simulation for both core and memory blocks. For example, for on-chip memories, the simulator takes care of the number of cycles required to access memory depending on wait states specified by the simulator configuration file.

Peripherals

The peripherals modeled by the simulator are PIE, FLASH, Timer and Vbus. The PIE, Timer and FLASH memory are available as add-on modules, while VBus is part of the C28x simulator core. In order to simulate a peripheral, it must be included in the configuration file. The syntax for including peripherals is specified in the *TMS320C28x Instruction Set Simulator User's Guide* (literature number SPRU003).

The F2810 and F2812 configurations of the simulator model the peripherals of those devices. The C28xx configuration models only the simulator core.

Supported Simulation Features

Port Connect

The C28x simulator provides the Port Connect feature for Program, Data, and I/O space for all processor configurations. The simulator has special instructions, such as IN, OUT, and UOUT for performing I/O reads and writes. Before using this feature, make sure that the address being connected to is already mapped in the configuration file. This is important in case of address in I/O, as the simulator by default does not include those addresses in its memory map. Please note that in the case of serial ports, data can be transmitted by connecting some files at the memory mapped locations for the serial port transmit register in write mode. Similarly, data can be received by connecting some files at the memory mapped locations for serial port receive register in read mode.

Pin Connect

The C28x simulator provides the Pin Connect feature for all processor configurations. The list of pins supported is shown in Table 2.

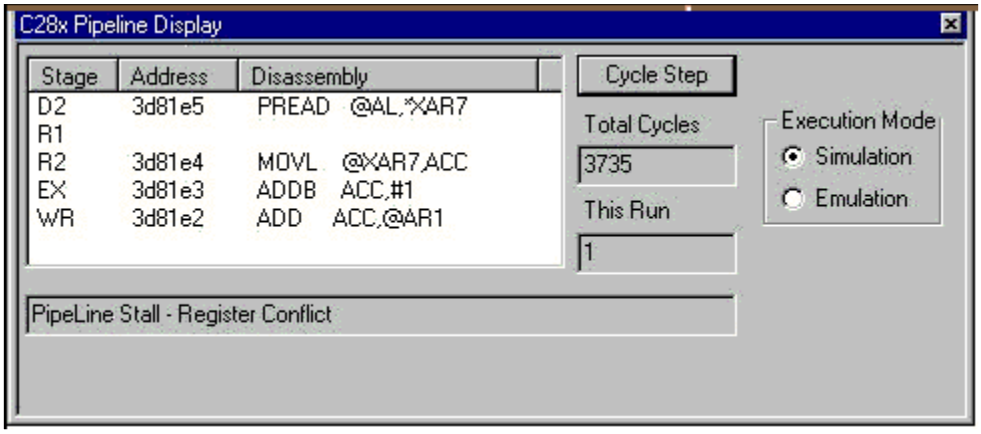
Table 2. Pins Supported by the Pin Connect Feature of theC28x Simulator

INT1
INT2
INT3
INT4
INT5
INT6
INT7
INT8
INT9
INT10
INT11
INT12
INT13
INT14
DLOGINT
RTOSINT
NMI
EMUINT

Pipeline Display

Figure 1 shows the five stages of the C28x pipeline display plug-in and indicates if the pipeline has been stalled due to a register or memory conflict.

Figure 1. C28x Pipeline Display Plug-In Window



Performance Numbers

Table 3 shows the performance numbers of the simulator. These numbers were gathered on a 900 MHz Intel™ Pentium™ III PC with 128MB of RAM. The application used for measurement is rsmbc.

Table 3. Performance Numbers of the C28x Simulator

SIMULATOR CONFIGURATION	SIMULATOR SPEED (IN KILOCYCLES/SECOND)
F28xx	24

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Related Documentation

TMS320C28x DSP CPU and Instruction Set Reference Guide (literature number SPRU430) describes the CPU and the assembly language instructions of the TMS320C28x fixed-point DSPs. It also describes emulation features available on these DSPs.

TMS320C28x Simulator User's Guide (literature number SPRU003) describes the basic capabilities of the simulator and the features provided for configuring it.

TMS320C28x Code Composer Studio Tutorial (literature number SPRH138) is an online help tutorial available through Code Composer Studio Help menu.

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