UNISIM
PowerPC G4 board Simulator Manual

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1 Simulator technical reference (generated)

This documentation has been automatically generated from the simulator `UNISIM embedded-ppc-g4-board` version 1.1beta2 on Oct 6 2011.

1.1 Introduction

UNISIM embedded-ppc-g4-board simulator is a MPC7447A/MPC107 board simulator with support of ELF32, ELF64, S19, and RAW binaries and targeted for industrial applications.
Section 1.2 gives licensing informations about the simulator. Section 1.3 shows the set of modules and services that compose the simulator. Section 1.4 shows how to invoke the simulator at the command line prompt. Section 1.5 gives the simulator parameters. Section 1.6 gives the simulator statistic counters. Section 1.7 gives the simulator statistic formulas.

1.2 Licensing

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1.3 Simulated configuration

The UNISIM embedded-ppc-g4-board simulator is composed of the following modules and services:

- **bus**: Front side bus
- **cpu**: PowerPC MPC7447A CPU
- **erom**: Memory
- **flash**: This module implements an AM29LV800BT flash memory with the following characteristics:
  Manufacturer ID: 0x010000
  Device ID word #0: 0xda225b
  Size: 4194304 bytes
  I/O width: 64 bits
  Number of chips: 4 chips
  I/O width per chip: 16 bits
  Size per chip: 1048576 bytes
  Number of Sectors: 19 sectors
  8-bit mode support: yes
  16-bit mode support: yes
  Access time: 70 ns

Byte programming time: 9000 us
Word programming time: 110000 us
Sector erasing time: 700000000 us
Chip erasing time: 14000000000 us

- **gdb-server**: this service implements the GDB server remote serial protocol over TCP/IP. Standards GDB clients (e.g. gdb, eclipse, ddd) can connect to the simulator to debug the target application that runs within the simulator.
- **host-time**: this service is an abstraction layer for the host machine time
- **inline-debugger**: this service implements a built-in debugger in the terminal console
- **loader**: A multi-format loader that supports ELF32, ELF64, S19, COFF and Raw binary files
- **loader.memory-mapper**: A memory mapper
- **loader.tee-backtrace**: This service/client implements a tee ('T'). It unifies the backtrace capability of several services that individually provides their own backtrace capability
- **loader.tee-blob**: This service/client implements a tee ('T'). It unifies the statement lookup capability of several services that individually provides their own statement lookup capability
- **loader.tee-loader**: This service/client implements a tee ('T'). It unifies the loader capability of several services that individually provides their own loader capability
- **loader.tee-stmt-lookup**: This service/client implements a tee ('T'). It unifies the statement lookup capability of several services that individually provides their own statement lookup capability
- **loader.tee-symbol-table-lookup**: This service/client implements a tee ('T'). It unifies the symbol table lookup capability of several services that individually provides their own symbol table lookup capability
- **memory**: Memory
- **mpc107**: MPC107 chipset
- **mpc107.DMA**: MPC107 integrated Direct Memory Access (DMA) controller
- **mpc107.address_mapper**: MPC107 Address mapper
- **mpc107.atu**: MPC107 integrated Address Translation Unit (ATU)
- **mpc107.epic**: MPC107 integrated Embedded Programmable Interrupt Controller (EPIC)
- **mpc107.pci_controller**: MPC107 integrated PCI bus controller
- **pci-bus**: PCI bus
- **pci-stub**: A module that implements a PCI target and acts as a co-simulation stub controlled over a TCP/IP or pipe connection.
- **tee-memory-access-reporting**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[0]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[10]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[11]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[12]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[13]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[14]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[15]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[1]**

- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[2]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[3]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[4]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[5]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[6]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[7]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[8]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control_selector[9]**
- **tee-symbol-table-lookup**: This service/client implements a tee ('T'). It unifies the symbol table lookup capability of several services that individually provides their own symbol table lookup capability
- **time**: this service is an abstraction layer for the SystemC kernel time

1.4 Using the UNISIM embedded-ppc-g4-board simulator

The UNISIM embedded-ppc-g4-board simulator has the following command line options:

Usage: `unisim-embedded-ppc-g4-board-1.1beta2 [<options>] [...]`
Options:

- `--set <param=value> or -s <param=value>`: set value of parameter 'param' to 'value'
- `--config <XML file> or -c <XML file>`: configures the simulator with the given XML configuration file
- `--get-config <XML file> or -g <XML file>`: get the simulator configuration XML file (you can use it to create your own configuration. This option can be combined with -c to get a new configuration file with existing variables from another file
- `--list or -l`: lists all available parameters, their type, and their current value
- `--warn or -w`: enable printing of kernel warnings
- `--doc <Latex file> or -d <Latex file>`: enable printing a latex documentation
- `--version or -v`: displays the program version information
- `--share-path <path> or -p <path>`: the path that should be used for the share directory (absolute path)
- `--help or -h`: displays this help

1.5 Configuration

Simulator configuration (see below) can be modified using command line Options `--set <param=value>` or `--config <config file>`.

Global

Name: `enable-gdb-server` **Type:** `parameter`
Default: `true` **Data type:** `boolean`
Valid: `true`, `false`

Description:
Enable/Disable GDB server instantiation.

Name: `enable-inline-debugger`	**Type:** `parameter`
Default: `true`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: Enable/Disable inline debugger instantiation.	
Name: `enable-press-enter-at-exit`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: Enable/Disable pressing key enter at exit.	
Name: `estimate-power`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: Enable/Disable power estimators instantiation.	
Name: `kernel_logger.file`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: Keep logger output in a file.	
Name: `kernel_logger.filename`	**Type:** `parameter`
Default: `logger_output.txt`	**Data type:** `string`
Description: Filename to keep logger output (the option file must be activated).	
Name: `kernel_logger.std_err`	**Type:** `parameter`
Default: `true`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: Show logger output through the standard error output.	
Name: `kernel_logger.std_err_color`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: Colorize logger output through the standard error output (only works if std_err is active).	
Name: `kernel_logger.std_out`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: Show logger output through the standard output.	

Name: kernel_logger.std_out_color **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
Colorize logger output through the standard output (only works if std_out is active).

Name: kernel_logger.xml_file **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
Keep logger output in a file xml formatted.

Name: kernel_logger.xml_file_gzipped **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
If the xml_file option is active, the output file will be compressed (a .gz extension will be automatically added to the xml_filename option.

Name: kernel_logger.xml_filename **Type:** parameter
Default: logger_output.xml **Data type:** string

Description:
Filename to keep logger xml output (the option xml_file must be activated).

Name: message-spy **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
Enable/Disable message spies instantiation.

bus

Name: bus.verbose **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
enable/disable verbosity.

Name: bus.cycle-time **Type:** parameter
Default: 13332 ps **Data type:** sc_time

Description:
cycle time.

cpu

Name: cpu.cpu-cycle-time **Type:** parameter
Default: 3333 **Data type:** unsigned 64-bit integer

Description:
CPU cycle time in picoseconds.

Name: `cpu.voltage` **Type:** `parameter`
Default: `1300` **Data type:** `unsigned 64-bit integer`

Description:
CPU voltage in mV.

Name: `cpu.max-inst` **Type:** `parameter`
Default: `18446744073709551615` **Data type:** `unsigned 64-bit integer`

Description:
maximum number of instructions to simulate.

Name: `cpu.verbose-all` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
globally enable/disable verbosity.

Name: `cpu.verbose-setup` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity while setup.

Name: `cpu.verbose-step` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when simulating an instruction.

Name: `cpu.verbose-dtlb` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when accessing data translation lookahead buffer.

Name: `cpu.verbose-itlb` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when accessing instruction translation lookahead buffer.

Name: `cpu.verbose-dl1` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when accessing L1 data cache.

Name: `cpu.verbose-il1` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when accessing L1 instruction cache.

Name: `cpu.verbose-l2` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when accessing L2 unified cache.

Name: `cpu.verbose-load` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when simulating a load.

Name: `cpu.verbose-store` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when simulating a store.

Name: `cpu.verbose-read-memory` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when reading memory for a debug purpose.

Name: `cpu.verbose-write-memory` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when writing memory for a debug purpose.

Name: `cpu.verbose-exception` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when handling exceptions.

Name: `cpu.verbose-set-msr` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when setting MSR.

Name: `cpu.verbose-set-hid0` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when setting HID0.

Name: `cpu.verbose-set-hid1` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when setting HID1.

Name: `cpu.verbose-set-hid2` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when setting HID2.

Name: `cpu.verbose-set-l2cr` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity when setting L2CR.

Name: `cpu.trap-on-instruction-counter` **Type:** `parameter`
Default: `18446744073709551615` **Data type:** `unsigned 64-bit integer`

Description:
number of simulated instruction before traping.

Name: `cpu.bus-cycle-time` **Type:** `parameter`
Default: `13332 ps` **Data type:** `sc_time`

Description:
bus cycle time.

Name: `cpu.nice-time` **Type:** `parameter`
Default: `1 ms` **Data type:** `sc_time`

Description:
maximum time between synchonizations.

Name: cpu.ipc	**Type:** parameter
Default: 1	**Data type:** double precision floating-point
Description: targeted average instructions per second.	

erom

Name: erom.org	**Type:** parameter
Default: 0x78000000	**Data type:** unsigned 32-bit integer
Description: memory origin/base address.	
Name: erom.bytesize	**Type:** parameter
Default: 16777216	**Data type:** unsigned 32-bit integer
Description: memory size in bytes.	
Name: erom.verbose	**Type:** parameter
Default: false	**Data type:** boolean
Valid: true, false	
Description: enable/disable verbosity.	
Name: erom.cycle-time	**Type:** parameter
Default: 13332 ps	**Data type:** sc_time
Description: RAM memory cycle time.	

flash

Name: flash.verbose	**Type:** parameter
Default: false	**Data type:** boolean
Valid: true, false	
Description: enable/disable verbosity.	
Name: flash.org	**Type:** parameter
Default: 0xff800000	**Data type:** unsigned 32-bit integer
Description: flash memory base address.	
Name: flash.bytesize	**Type:** parameter
Default: 8388608	**Data type:** unsigned 32-bit integer

Description:
flash memory size in bytes.

Name: `flash.endian` **Type:** `parameter`
Default: `big-endian` **Data type:** `endianess`
Valid: `little-endian`, `big-endian`

Description:
endianness of flash memory.

Name: `flash.sector-protect[0]` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable sector write protection.

Name: `flash.sector-protect[1]` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable sector write protection.

Name: `flash.sector-protect[2]` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable sector write protection.

Name: `flash.sector-protect[3]` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable sector write protection.

Name: `flash.sector-protect[4]` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable sector write protection.

Name: `flash.sector-protect[5]` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable sector write protection.

Name: `flash.sector-protect[6]`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: enable/disable sector write protection.	
Name: `flash.sector-protect[7]`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: enable/disable sector write protection.	
Name: `flash.sector-protect[8]`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: enable/disable sector write protection.	
Name: `flash.sector-protect[9]`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: enable/disable sector write protection.	
Name: `flash.sector-protect[10]`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: enable/disable sector write protection.	
Name: `flash.sector-protect[11]`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: enable/disable sector write protection.	
Name: `flash.sector-protect[12]`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: enable/disable sector write protection.	
Name: `flash.sector-protect[13]`	**Type:** `parameter`
Default: `false`	**Data type:** `boolean`
Valid: `true`, `false`	
Description: enable/disable sector write protection.	

Name: flash.sector-protect[14] **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
enable/disable sector write protection.

Name: flash.sector-protect[15] **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
enable/disable sector write protection.

Name: flash.sector-protect[16] **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
enable/disable sector write protection.

Name: flash.sector-protect[17] **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
enable/disable sector write protection.

Name: flash.sector-protect[18] **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
enable/disable sector write protection.

Name: flash.fsm-to-graphviz-output-↪filename **Type:** parameter
Default: **Data type:** string

Description:
FSM (finite state machine) to Graphviz output filename.

Name: flash.cycle-time **Type:** parameter
Default: 13332 ps **Data type:** sc_time

Description:
flash memory cycle time.

gdb-server

Name: gdb-server.memory-atom-size **Type:** parameter
Default: 0x00000001 **Data type:** unsigned 32-bit integer

Description:
size of the smallest addressable element in memory.

Name: `gdb-server.tcp-port` **Type:** `parameter`
Default: `0x00000000` **Data type:** `signed 32-bit integer`

Description:
TCP/IP port to listen waiting for a GDB client connection.

Name: `gdb-server.architecture-description-filename` **Type:** `parameter`
Default: `gdb_powerpc.xml` **Data type:** `string`

Description:
filename of a XML description of the connected processor.

Name: `gdb-server.verbose` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
Enable/Disable verbosity.

inline-debugger

Name: `inline-debugger.memory-atom-size` **Type:** `parameter`
Default: `0x00000001` **Data type:** `unsigned 32-bit integer`

Description:
size of the smallest addressable element in memory.

Name: `inline-debugger.num-loaders` **Type:** `parameter`
Default: `1` **Data type:** `unsigned 32-bit integer`

Description:
number of loaders.

Name: `inline-debugger.search-path` **Type:** `parameter`
Default: **Data type:** `string`

Description:
Search path for source (separated by ';').

loader

Name: `loader.verbose` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
Enable/Disable verbosity.

Name: `loader.verbose-parser` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
Enable/Disable verbosity of parser.

Name: `loader.filename` **Type:** `parameter`
Default: **Data type:** `string`

Description:
List of files to load. Syntax: [[filename=]<filename1>[:[format=]<format1>]][,[filename=]<filename2>[:[form
(e.g. boot.bin:raw,app.elf).

loader.memory-mapper

Name: `loader.memory-mapper.verbose` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
Enable/Disable verbosity.

Name: `loader.memory-mapper.verbose-`
`↪parser` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
Enable/Disable verbosity of parser.

Name: `loader.memory-mapper.mapping` **Type:** `parameter`
Default: `mpc107:0x00000000-0xffffffff` **Data type:** `string`

Description:
Memory mapping. Syntax: [[(memory=]<memory1>[:[range=]<low1-high1>]][,[(memory=]<memory2>[:[range=]<low2-high2>]]... (e.g. ram:0x0-0x00ffff,rom:0xff0000-0xffffff).

memory

Name: `memory.org` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
memory origin/base address.

Name: `memory.bytesize` **Type:** `parameter`
Default: `268435456` **Data type:** `unsigned 32-bit integer`

Description:
memory size in bytes.

Name: `memory.verbose` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity.

Name: `memory.cycle-time` **Type:** `parameter`
Default: `13332 ps` **Data type:** `sc_time`

Description:
RAM memory cycle time.

mpc107

Name: `mpc107.verbose` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity.

Name: `mpc107.host_mode` **Type:** `parameter`
Default: `true` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable host mode.

Name: `mpc107.a_address_map` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable address map A.

Name: `mpc107.memory_32bit_data_bus_↪size` **Type:** `parameter`
Default: `true` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable 32-bit data bus width.

Name: `mpc107.rom0_8bit_data_bus_↪size` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable rom #0 8-bit data bus width.

Name: mpc107.rom1_8bit_data_bus_↪size
Type: parameter
Default: false
Data type: boolean
Valid: true, false

Description:
enable/disable rom #1 8-bit data bus width.

Name: mpc107.frequency
Type: parameter
Default: 75
Data type: unsigned 32-bit integer

Description:
frequency in Mhz.

Name: mpc107.sdram_cycle_time
Type: parameter
Default: 13332
Data type: unsigned 64-bit integer

Description:
SDRAM cycle time in picoseconds.

mpc107.DMA

Name: mpc107.DMA.verbose
Type: parameter
Default: false
Data type: boolean
Valid: true, false

Description:
Enable/Disable verbosity.

mpc107.address_mapper

Name: mpc107.address_mapper.verbose
Type: parameter
Default: false
Data type: boolean
Valid: true, false

Description:
enable/disable verbosity.

mpc107.atu

Name: mpc107.atu.verbose
Type: parameter
Default: false
Data type: boolean
Valid: true, false

Description:
enable/disable verbosity.

mpc107.epic

Name: mpc107.epic.verbose
Type: parameter
Default: false
Data type: boolean
Valid: true, false

Description:
enable/disable verbosity.

mpc107.pci_controller

Name: mpc107.pci_controller.verbose **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
enable/disable verbosity.

pci-bus

Name: pci-bus.verbose **Type:** parameter
Default: false **Data type:** boolean
Valid: true, false

Description:
enable/disable verbosity.

Name: pci-bus.num-mappings **Type:** parameter
Default: 1 **Data type:** unsigned 32-bit integer

Description:
total number of address mappings.

Name: pci-bus.base-address[0] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: base address of mapped device.

Name: pci-bus.base-address[1] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: base address of mapped device.

Name: pci-bus.base-address[2] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: base address of mapped device.

Name: pci-bus.base-address[3] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: base address of mapped device.

Name: pci-bus.base-address[4] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[5]`	**Type:** `parameter`
Default: `0x00000000`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[6]`	**Type:** `parameter`
Default: `0x00000000`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.size[0]`	**Type:** `parameter`
Default: `1073741824`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[1]`	**Type:** `parameter`
Default: `0`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[2]`	**Type:** `parameter`
Default: `0`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[3]`	**Type:** `parameter`
Default: `0`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[4]`	**Type:** `parameter`
Default: `0`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[5]`	**Type:** `parameter`
Default: `0`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[6]` **Type:** `parameter`
Default: `0` **Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.device-number[0]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[1]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[2]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[3]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[4]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[5]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: pci-bus.device-number[6] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: device number.

Name: pci-bus.target-port[0] **Type:** parameter
Default: 0 **Data type:** unsigned 32-bit integer

Description:
mapping: target port number.

Name: pci-bus.target-port[1] **Type:** parameter
Default: 0 **Data type:** unsigned 32-bit integer

Description:
mapping: target port number.

Name: pci-bus.target-port[2] **Type:** parameter
Default: 0 **Data type:** unsigned 32-bit integer

Description:
mapping: target port number.

Name: pci-bus.target-port[3] **Type:** parameter
Default: 0 **Data type:** unsigned 32-bit integer

Description:
mapping: target port number.

Name: pci-bus.target-port[4] **Type:** parameter
Default: 0 **Data type:** unsigned 32-bit integer

Description:
mapping: target port number.

Name: pci-bus.target-port[5] **Type:** parameter
Default: 0 **Data type:** unsigned 32-bit integer

Description:
mapping: target port number.

Name: pci-bus.target-port[6] **Type:** parameter
Default: 0 **Data type:** unsigned 32-bit integer

Description:
mapping: target port number.

Name: pci-bus.register-number[0] **Type:** parameter
Default: 0x00000010 **Data type:** unsigned 32-bit integer

Description:
mapping: BAR offset in PCI device configuration space.

Name: pci-bus.register-number[1] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: BAR offset in PCI device configuration space.

Name: pci-bus.register-number[2] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: BAR offset in PCI device configuration space.

Name: pci-bus.register-number[3] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: BAR offset in PCI device configuration space.

Name: pci-bus.register-number[4] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: BAR offset in PCI device configuration space.

Name: pci-bus.register-number[5] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: BAR offset in PCI device configuration space.

Name: pci-bus.register-number[6] **Type:** parameter
Default: 0x00000000 **Data type:** unsigned 32-bit integer

Description:
mapping: BAR offset in PCI device configuration space.

Name: pci-bus.addr-type[0] **Type:** parameter
Default: mem **Data type:** pci space
Valid: mem, i/o, cfg

Description:
mapping: address space type.

Name: `pci-bus.addr-type[1]` **Type:** `parameter`
Default: `mem` **Data type:** `pci space`
Valid: `mem`, `i/o`, `cfg`

Description:
mapping: address space type.

Name: `pci-bus.addr-type[2]` **Type:** `parameter`
Default: `mem` **Data type:** `pci space`
Valid: `mem`, `i/o`, `cfg`

Description:
mapping: address space type.

Name: `pci-bus.addr-type[3]` **Type:** `parameter`
Default: `mem` **Data type:** `pci space`
Valid: `mem`, `i/o`, `cfg`

Description:
mapping: address space type.

Name: `pci-bus.addr-type[4]` **Type:** `parameter`
Default: `mem` **Data type:** `pci space`
Valid: `mem`, `i/o`, `cfg`

Description:
mapping: address space type.

Name: `pci-bus.addr-type[5]` **Type:** `parameter`
Default: `mem` **Data type:** `pci space`
Valid: `mem`, `i/o`, `cfg`

Description:
mapping: address space type.

Name: `pci-bus.addr-type[6]` **Type:** `parameter`
Default: `mem` **Data type:** `pci space`
Valid: `mem`, `i/o`, `cfg`

Description:
mapping: address space type.

Name: `pci-bus.frequency` **Type:** `parameter`
Default: `33` **Data type:** `unsigned 32-bit integer`

Description:
frequency in Mhz.

pci-stub

Name: `pci-stub.verbose` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Name: `pci-stub.is-server` **Type:** `parameter`

Default: `false` **Valid:** `true`, `false`	**Data type:** `boolean`
Name: `pci-stub.protocol` **Default:** `0x00000000`	**Type:** `parameter` **Data type:** `unsigned 32-bit integer`
Name: `pci-stub.pipe-name` **Default:** `pipe`	**Type:** `parameter` **Data type:** `string`
Name: `pci-stub.server-name` **Default:** `localhost`	**Type:** `parameter` **Data type:** `string`
Name: `pci-stub.tcp-port` **Default:** `0x00003039`	**Type:** `parameter` **Data type:** `unsigned 32-bit integer`
Name: `pci-stub.initial-base-addr[↪0]` **Default:** `0x00000000`	**Type:** `parameter` **Data type:** `unsigned 32-bit integer`
Name: `pci-stub.initial-base-addr[↪1]` **Default:** `0x00000000`	**Type:** `parameter` **Data type:** `unsigned 32-bit integer`
Name: `pci-stub.initial-base-addr[↪2]` **Default:** `0x00000000`	**Type:** `parameter` **Data type:** `unsigned 32-bit integer`
Name: `pci-stub.initial-base-addr[↪3]` **Default:** `0x00000000`	**Type:** `parameter` **Data type:** `unsigned 32-bit integer`
Name: `pci-stub.initial-base-addr[↪4]` **Default:** `0x00000000`	**Type:** `parameter` **Data type:** `unsigned 32-bit integer`
Name: `pci-stub.initial-base-addr[↪5]` **Default:** `0x00000000`	**Type:** `parameter` **Data type:** `unsigned 32-bit integer`
Name: `pci-stub.address-space[0]` **Default:** `mem` **Valid:** `mem`, `i/o`, `cfg`	**Type:** `parameter` **Data type:** `pci space`
Name: `pci-stub.address-space[1]` **Default:** `mem` **Valid:** `mem`, `i/o`, `cfg`	**Type:** `parameter` **Data type:** `pci space`
Name: `pci-stub.address-space[2]` **Default:** `mem` **Valid:** `mem`, `i/o`, `cfg`	**Type:** `parameter` **Data type:** `pci space`

Name: pci-stub.address-space[3] **Default:** mem **Valid:** mem, i/o, cfg	**Type:** parameter **Data type:** pci space
Name: pci-stub.address-space[4] **Default:** mem **Valid:** mem, i/o, cfg	**Type:** parameter **Data type:** pci space
Name: pci-stub.address-space[5] **Default:** mem **Valid:** mem, i/o, cfg	**Type:** parameter **Data type:** pci space
Name: pci-stub.region-size[0] **Default:** 0x00000000	**Type:** parameter **Data type:** unsigned 32-bit integer
Name: pci-stub.region-size[1] **Default:** 0x00000000	**Type:** parameter **Data type:** unsigned 32-bit integer
Name: pci-stub.region-size[2] **Default:** 0x00000000	**Type:** parameter **Data type:** unsigned 32-bit integer
Name: pci-stub.region-size[3] **Default:** 0x00000000	**Type:** parameter **Data type:** unsigned 32-bit integer
Name: pci-stub.region-size[4] **Default:** 0x00000000	**Type:** parameter **Data type:** unsigned 32-bit integer
Name: pci-stub.region-size[5] **Default:** 0x00000000	**Type:** parameter **Data type:** unsigned 32-bit integer
Name: pci-stub.pci-device-number **Default:** 0x00000000	**Type:** parameter **Data type:** unsigned 32-bit integer
Name: pci-stub.pci-bus-frequency **Default:** 0x00000021	**Type:** parameter **Data type:** unsigned 32-bit integer
Name: pci-stub.bus-frequency **Default:** 0x0000004b	**Type:** parameter **Data type:** unsigned 32-bit integer

1.6 Statistics

Simulation statistic counters are listed below:

cpu	
Name: cpu.instruction-counter **Description:** number of simulated instructions.	**Type:** statistic **Data type:** unsigned 64-bit integer
Name: cpu.cpu-cycle	**Type:** statistic **Data type:** unsigned 64-bit integer

Description:
number of simulated CPU cycles.

Name: `cpu.bus-cycle` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of simulated bus cycles.

Name: `cpu.num-il1-accesses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of accesses to L1 instruction cache.

Name: `cpu.num-il1-misses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of misses to L1 instruction cache.

Name: `cpu.num-dl1-accesses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of accesses to L1 data cache.

Name: `cpu.num-dl1-misses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of misses to L1 data cache.

Name: `cpu.num-l2-accesses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of accesses to unified L2 cache.

Name: `cpu.num-l2-misses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of misses to unified L2 cache.

Name: `cpu.num-ibat-accesses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of accesses to IBATs.

Name: `cpu.num-ibat-misses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of misses to IBATs.

Name: `cpu.num-dbat-accesses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of accesses to DBATs.

Name: `cpu.num-dbat-misses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of misses to DBATs.

Name: `cpu.num-itlb-accesses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of accesses to ITLB.

Name: `cpu.num-itlb-misses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of misses to ITLB.

Name: `cpu.num-dtlb-accesses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of accesses to DTLB.

Name: `cpu.num-dtlb-misses` **Type:** `statistic`
Data type: `unsigned 64-bit integer`

Description:
number of misses to DTLB.

erom

Name: `erom.memory-usage` **Type:** `statistic`

	Data type: `unsigned 32-bit integer`

Description:
host memory usage in bytes of simulated memory.

memory	
Name: `memory.memory-usage`	**Type:** `statistic` **Data type:** `unsigned 32-bit integer`

Description:
host memory usage in bytes of simulated memory.

1.7 Formulas

Simulation statistic formulas are listed below:

cpu		
Name: `cpu.il1-miss-rate`	**Type:** `formula`	
Formula: `cpu.num-il1-misses / cpu.num-il1-accesses`	**Data type:** `floating-point`	`double precision`
Name: `cpu.dl1-miss-rate`	**Type:** `formula`	
Formula: `cpu.num-dl1-misses / cpu.num-dl1-accesses`	**Data type:** `floating-point`	`double precision`
Name: `cpu.l2-miss-rate`	**Type:** `formula`	
Formula: `cpu.num-l2-misses / cpu.num-l2-accesses`	**Data type:** `floating-point`	`double precision`
Name: `cpu.ibat-miss-rate`	**Type:** `formula`	
Formula: `cpu.num-ibat-misses / cpu.num-ibat-accesses`	**Data type:** `floating-point`	`double precision`
Name: `cpu.dbat-miss-rate`	**Type:** `formula`	
Formula: `cpu.num-dbat-misses / cpu.num-dbat-accesses`	**Data type:** `floating-point`	`double precision`
Name: `cpu.itlb-miss-rate`	**Type:** `formula`	
Formula: `cpu.num-itlb-misses / cpu.num-itlb-accesses`	**Data type:** `floating-point`	`double precision`
Name: `cpu.dtlb-miss-rate`	**Type:** `formula`	
Formula: `cpu.num-dtlb-misses / cpu.num-dtlb-accesses`	**Data type:** `floating-point`	`double precision`