UNISIM
ppcemu-system Simulator Manual

Gilles Mouchard

1 Simulator technical reference (generated)

This documentation has been automatically generated from the simulator `UNISIM ppcemu-system` version 1.0beta2 on Oct 10 2011.

1.1 Introduction

UNISIM ppcemu-system is a full system simulator of a board including a MPC7447A PowerPC processor, a MPC107 chipset, and supporting Linux boot. The simulated board is very similar to a PowerMac G4 PCI machine. Computations on IEEE 754 floating point numbers are emulated using Simfloat++. Altivec instructions are currently decoded but not implemented. The running PowerPC application is a PowerMac Linux Kernel and all the applications installed on the hard disk image and/or the initial RAM disk image. Software running on the simulated hardware can be debugged by connecting a GDB client to the simulator through the GDB serial remote protocol. The GDB client can be either the standard text based client (i.e. command gdb), a graphical front-end to GDB (e.g. ddd), or even Eclipse CDT..
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 ppcemu-system 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.
- **heathrow**: Heathrow Programmable Interrupt Controller (PIC)
- **host-time**: this service is an abstraction layer for the host machine time
- **i8042**: i8042 PS/2 keyboard/mouse controller
- **inline-debugger**: this service implements a built-in debugger in the terminal console
- **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-display**: PCI Video frame buffer display
- **pci-ide**: PIIX4 IDE controller
- **pci-isa-bridge**: PCI-to-ISA bridge
- **pmac-linux-kernel-loader**: PowerMac Linux kernel loader
- **pmac-linux-kernel-loader.elf32-loader**: this service implements an ELF32 Loader
- **pmac-linux-kernel-loader.pmac-bootx**: This service is a PowerMac BootX loader emulator. It allows bootloading a PowerMac Linux kernel with its initial ramdisk and device tree
- **sdl**: SDL (Simple DirectMedia Layer) wrapper
- **time**: this service is an abstraction layer for the SystemC kernel time

1.4 Using the UNISIM ppcemu-system simulator

The UNISIM ppcemu-system simulator has the following command line options:

Usage: `unisim-ppcemu-system-1.0beta2 [<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` **Default:** `true` **Valid:** `true`, `false` **Description:** Enable/Disable GDB server instantiation.	**Type:** `parameter` **Data type:** `boolean`
Name: `enable-inline-debugger` **Default:** `true` **Valid:** `true`, `false` **Description:** Enable/Disable inline debugger instantiation.	**Type:** `parameter` **Data type:** `boolean`
Name: `enable-press-enter-at-exit` **Default:** `false` **Valid:** `true`, `false` **Description:** Enable/Disable pressing key enter at exit.	**Type:** `parameter` **Data type:** `boolean`
Name: `estimate-power` **Default:** `false` **Valid:** `true`, `false` **Description:** Enable/Disable power estimators instantiation.	**Type:** `parameter` **Data type:** `boolean`
Name: `kernel_logger.file` **Default:** `false` **Valid:** `true`, `false` **Description:** Keep logger output in a file.	**Type:** `parameter` **Data type:** `boolean`

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: `13333 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: 13333 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: `13333 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: 13333 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: 0x000004d2 **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.

heathrow

Name: heathrow.verbose **Type:** parameter

Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity.

Name: `heathrow.initial-base-addr` **Type:** `parameter`
Default: `0xf3000000` **Data type:** `unsigned 32-bit integer`

Description:
initial base address of memory space.

Name: `heathrow.pci-device-number` **Type:** `parameter`
Default: `0x00000001` **Data type:** `unsigned 32-bit integer`

Description:
PCI device number.

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

Description:
bus frequency in Mhz.

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

Description:
PCI bus frequency in Mhz.

i8042

Name: `i8042.isa-bus-frequency` **Type:** `parameter`
Default: `8` **Data type:** `unsigned 32-bit integer`

Description:
ISA bus frequency in Mhz.

Name: `i8042.fsb-frequency` **Type:** `parameter`
Default: `75` **Data type:** `unsigned 32-bit integer`

Description:
front side bus frequency in Mhz.

Name: `i8042.typematic-rate` **Type:** `parameter`
Default: `30` **Data type:** `double precision floating-point`

Description:
typematic rate (key strokes per second).

Name: `i8042.typematic-delay` **Type:** `parameter`
Default: `0.25` **Data type:** `double precision floating-point`

Description:
typematic delay (key repeat delay in seconds).

Name: `i8042.speed-boost` **Type:** `parameter`
Default: `30` **Data type:** `double precision floating-point`

Description:
speed-boost factor.

Name: `i8042.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 ';').

Name: `inline-debugger.init-macro` **Type:** `parameter`
Default: **Data type:** `string`

Description:
path to initial macro to run when debugger starts.

Name: inline-debugger.output **Type:** parameter
Default: **Data type:** string

Description:
path to output file where to redirect the debugger outputs.

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: 13333 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: 13333
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: `10` **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: `0xf3000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[2]` **Type:** `parameter`
Default: `0x00018100` **Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[3]` **Type:** `parameter`
Default: `0x00018108` **Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[4]` **Type:** `parameter`
Default: `0x00000004` **Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[5]` **Type:** `parameter`
Default: `0x0000000c` **Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[6]` **Type:** `parameter`
Default: `0x00018118` **Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[7]` **Type:** `parameter`
Default: `0xa0000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[8]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
mapping: base address of mapped device.

Name: `pci-bus.base-address[9]` **Type:** `parameter`
Default: `0x000a0000` **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: `524288`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[2]`	**Type:** `parameter`
Default: `8`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[3]`	**Type:** `parameter`
Default: `4`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[4]`	**Type:** `parameter`
Default: `8`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[5]`	**Type:** `parameter`
Default: `4`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[6]`	**Type:** `parameter`
Default: `16`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[7]`	**Type:** `parameter`
Default: `8388608`	**Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[8]` **Type:** `parameter`
Default: `65536` **Data type:** `unsigned 32-bit integer`

Description:
mapping: size in bytes of mapped device.

Name: `pci-bus.size[9]` **Type:** `parameter`
Default: `393216` **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: `0x00000001` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[2]` **Type:** `parameter`
Default: `0x00000002` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[3]` **Type:** `parameter`
Default: `0x00000002` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[4]` **Type:** `parameter`
Default: `0x00000002` **Data type:** `unsigned 32-bit integer`

Description:
mapping: device number.

Name: `pci-bus.device-number[5]`	**Type:** `parameter`
Default: `0x00000002`	**Data type:** `unsigned 32-bit integer`
Description: mapping: device number.	
Name: `pci-bus.device-number[6]`	**Type:** `parameter`
Default: `0x00000002`	**Data type:** `unsigned 32-bit integer`
Description: mapping: device number.	
Name: `pci-bus.device-number[7]`	**Type:** `parameter`
Default: `0x00000003`	**Data type:** `unsigned 32-bit integer`
Description: mapping: device number.	
Name: `pci-bus.device-number[8]`	**Type:** `parameter`
Default: `0x00000004`	**Data type:** `unsigned 32-bit integer`
Description: mapping: device number.	
Name: `pci-bus.device-number[9]`	**Type:** `parameter`
Default: `0x00000004`	**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: `1`	**Data type:** `unsigned 32-bit integer`
Description: mapping: target port number.	
Name: `pci-bus.target-port[2]`	**Type:** `parameter`
Default: `2`	**Data type:** `unsigned 32-bit integer`
Description: mapping: target port number.	

Name: `pci-bus.target-port[3]`	**Type:** `parameter`
Default: `2`	**Data type:** `unsigned 32-bit integer`
Description: mapping: target port number.	
Name: `pci-bus.target-port[4]`	**Type:** `parameter`
Default: `2`	**Data type:** `unsigned 32-bit integer`
Description: mapping: target port number.	
Name: `pci-bus.target-port[5]`	**Type:** `parameter`
Default: `2`	**Data type:** `unsigned 32-bit integer`
Description: mapping: target port number.	
Name: `pci-bus.target-port[6]`	**Type:** `parameter`
Default: `2`	**Data type:** `unsigned 32-bit integer`
Description: mapping: target port number.	
Name: `pci-bus.target-port[7]`	**Type:** `parameter`
Default: `3`	**Data type:** `unsigned 32-bit integer`
Description: mapping: target port number.	
Name: `pci-bus.target-port[8]`	**Type:** `parameter`
Default: `4`	**Data type:** `unsigned 32-bit integer`
Description: mapping: target port number.	
Name: `pci-bus.target-port[9]`	**Type:** `parameter`
Default: `4`	**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: 0x00000010 **Data type:** unsigned 32-bit integer

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

Name: pci-bus.register-number[2] **Type:** parameter
Default: 0x00000010 **Data type:** unsigned 32-bit integer

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

Name: pci-bus.register-number[3] **Type:** parameter
Default: 0x00000014 **Data type:** unsigned 32-bit integer

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

Name: pci-bus.register-number[4] **Type:** parameter
Default: 0x00000018 **Data type:** unsigned 32-bit integer

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

Name: pci-bus.register-number[5] **Type:** parameter
Default: 0x0000001c **Data type:** unsigned 32-bit integer

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

Name: pci-bus.register-number[6] **Type:** parameter
Default: 0x00000020 **Data type:** unsigned 32-bit integer

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

Name: pci-bus.register-number[7] **Type:** parameter
Default: 0x00000010 **Data type:** unsigned 32-bit integer

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

Name: pci-bus.register-number[8] **Type:** parameter
Default: 0x00000010 **Data type:** unsigned 32-bit integer

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

Name: `pci-bus.register-number[9]`	**Type:** `parameter`
Default: `0x00000014`	**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: `i/o`	**Data type:** `pci space`
Valid: `mem`, `i/o`, `cfg`	

Description:
mapping: address space type.

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

Description:
mapping: address space type.

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

Description:
mapping: address space type.

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

Description:
mapping: address space type.

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

Description:
mapping: address space type.

Name: pci-bus.addr-type[7] **Type:** parameter
Default: mem **Data type:** pci space
Valid: mem, i/o, cfg

Description:
mapping: address space type.

Name: pci-bus.addr-type[8] **Type:** parameter
Default: i/o **Data type:** pci space
Valid: mem, i/o, cfg

Description:
mapping: address space type.

Name: pci-bus.addr-type[9] **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-display

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

Description:
enable/disable verbosity.

Name: pci-display.width **Type:** parameter
Default: 640 **Data type:** unsigned 32-bit integer

Description:
screen width in pixels.

Name: pci-display.height **Type:** parameter
Default: 480 **Data type:** unsigned 32-bit integer

Description:
screen height in pixels.

Name: pci-display.depth **Type:** parameter
Default: 15 **Data type:** unsigned 32-bit integer

Description:
screen depth in bits per pixel.

Name: `pci-display.bytesize` **Type:** `parameter`
Default: `8388608` **Data type:** `unsigned 32-bit integer`

Description:
frame buffer size in bytes.

Name: `pci-display.initial-base-addr` **Type:** `parameter`
Default: `0xa0000000` **Data type:** `unsigned 32-bit integer`

Description:
initial base address of memory space.

Name: `pci-display.pci-device-number` **Type:** `parameter`
Default: `0x00000003` **Data type:** `unsigned 32-bit integer`

Description:
PCI device number.

Name: `pci-display.pci-bus-frequency` **Type:** `parameter`
Default: `0x00000021` **Data type:** `unsigned 32-bit integer`

Description:
PCI bus frequency.

pci-ide

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

Name: `pci-ide.base-address[0]` **Type:** `parameter`
Default: `0x00018101` **Data type:** `unsigned 32-bit integer`

Description:
initial base address of memory space.

Name: `pci-ide.base-address[1]` **Type:** `parameter`
Default: `0x00018109` **Data type:** `unsigned 32-bit integer`

Description:
initial base address of memory space.

Name: `pci-ide.base-address[2]` **Type:** `parameter`
Default: `0x00000005` **Data type:** `unsigned 32-bit integer`

Description:
initial base address of memory space.

Name: `pci-ide.base-address[3]`	**Type:** `parameter`
Default: `0x0000000d`	**Data type:** `unsigned 32-bit integer`
Description: initial base address of memory space.	
Name: `pci-ide.base-address[4]`	**Type:** `parameter`
Default: `0x00018119`	**Data type:** `unsigned 32-bit integer`
Description: initial base address of memory space.	
Name: `pci-ide.size[0]`	**Type:** `parameter`
Default: `0x00000008`	**Data type:** `unsigned 32-bit integer`
Description: size in bytes of memory space.	
Name: `pci-ide.size[1]`	**Type:** `parameter`
Default: `0x00000004`	**Data type:** `unsigned 32-bit integer`
Description: size in bytes of memory space.	
Name: `pci-ide.size[2]`	**Type:** `parameter`
Default: `0x00000008`	**Data type:** `unsigned 32-bit integer`
Description: size in bytes of memory space.	
Name: `pci-ide.size[3]`	**Type:** `parameter`
Default: `0x00000004`	**Data type:** `unsigned 32-bit integer`
Description: size in bytes of memory space.	
Name: `pci-ide.size[4]`	**Type:** `parameter`
Default: `0x00000010`	**Data type:** `unsigned 32-bit integer`
Description: size in bytes of memory space.	
Name: `pci-ide.register-number[0]`	**Type:** `parameter`
Default: `0x00000010`	**Data type:** `unsigned 32-bit integer`
Description: BAR offset in PCI configuration space.	

Name: `pci-ide.register-number[1]`	**Type:** `parameter`
Default: `0x00000014`	**Data type:** `unsigned 32-bit integer`
Description: BAR offset in PCI configuration space.	
Name: `pci-ide.register-number[2]`	**Type:** `parameter`
Default: `0x00000018`	**Data type:** `unsigned 32-bit integer`
Description: BAR offset in PCI configuration space.	
Name: `pci-ide.register-number[3]`	**Type:** `parameter`
Default: `0x0000001c`	**Data type:** `unsigned 32-bit integer`
Description: BAR offset in PCI configuration space.	
Name: `pci-ide.register-number[4]`	**Type:** `parameter`
Default: `0x00000020`	**Data type:** `unsigned 32-bit integer`
Description: BAR offset in PCI configuration space.	
Name: `pci-ide.device-number`	**Type:** `parameter`
Default: `0x00000002`	**Data type:** `unsigned 32-bit integer`
Description: PCI device number.	
Name: `pci-ide.disk-image[0]`	**Type:** `parameter`
Default:	**Data type:** `string`
Description: Raw disk image filename.	
Name: `pci-ide.disk-image[1]`	**Type:** `parameter`
Default:	**Data type:** `string`
Description: Raw disk image filename.	
Name: `pci-ide.disk-image[2]`	**Type:** `parameter`
Default:	**Data type:** `string`
Description: Raw disk image filename.	

Name: `pci-ide.disk-channel[0]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
disk channel.

Name: `pci-ide.disk-channel[1]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
disk channel.

Name: `pci-ide.disk-channel[2]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
disk channel.

Name: `pci-ide.disk-num[0]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
disk number (0=master 1=slave).

Name: `pci-ide.disk-num[1]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
disk number (0=master 1=slave).

Name: `pci-ide.disk-num[2]` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
disk number (0=master 1=slave).

pci-isa-bridge

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

Description:
enable/disable verbosity.

Name: `pci-isa-bridge.initial-base-`
`↪addr` **Type:** `parameter`
Default: `0x000a0000` **Data type:** `unsigned 32-bit integer`

Description:
intial base address of memory space.

Name: `pci-isa-bridge.initial-io-base-addr` **Type:** `parameter`
Default: `0x00000000` **Data type:** `unsigned 32-bit integer`

Description:
initial base address of I/O space.

Name: `pci-isa-bridge.pci-device-number` **Type:** `parameter`
Default: `0x00000004` **Data type:** `unsigned 32-bit integer`

Description:
PCI device number.

Name: `pci-isa-bridge.isa-bus-frequency` **Type:** `parameter`
Default: `8` **Data type:** `unsigned 32-bit integer`

Description:
ISA bus frequency in Mhz.

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

Description:
PCI bus frequency in Mhz.

pmac-linux-kernel-loader.elf32-loader

Name: `pmac-linux-kernel-loader.elf32-loader.filename` **Type:** `parameter`
Default: `vmlinux` **Data type:** `string`

Description:
the ELF filename to load into memory.

Name: `pmac-linux-kernel-loader.elf32-loader.base-addr` **Type:** `parameter`
Default: `0x00400000` **Data type:** `unsigned 32-bit integer`

Description:
if force-base-addr is true force base address for a unique program segment, otherwise ignored.

Name: `pmac-linux-kernel-loader.elf32-loader.force-base-addr` **Type:** `parameter`

Default: `true` **Data type:** `boolean`
Valid: `true`, `false`

Description:
if true force base address for a unique program segment.

Name: `pmac-linux-kernel-loader.elf32-loader.force-use-virtual-address` **Type:** `parameter`
Default: `true` **Data type:** `boolean`
Valid: `true`, `false`

Description:
force use of virtual addresses instead of physical addresses.

Name: `pmac-linux-kernel-loader.elf32-loader.initialize-extra-segment-bytes` **Type:** `parameter`
Default: `true` **Data type:** `boolean`
Valid: `true`, `false`

Description:
whether to initialize extra bytes in segments (p_filesz < p_memsz) to zero (true for standard ELF files).

Name: `pmac-linux-kernel-loader.elf32-loader.dump-headers` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
dump headers while loading ELF file.

Name: `pmac-linux-kernel-loader.elf32-loader.verbose` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity.

Name: `pmac-linux-kernel-loader.elf32-loader.dwarf-to-html-output-directory` **Type:** `parameter`
Default: **Data type:** `string`

Description:
DWARF v2/v3 to HTML output directory.

Name: `pmac-linux-kernel-loader.elf32-loader.parse-dwarf` **Type:** `parameter`
Default: `true` **Data type:** `boolean`
Valid: `true`, `false`

Description:
Enable/Disable parsing of DWARF debugging informations.

pmac-linux-kernel-loader.pmac-bootx

Name: `pmac-linux-kernel-loader.pmac-↪bootx.device-tree-filename` **Type:** `parameter`
Default: `device_tree_pmac_g4.xml` **Data type:** `string`

Description:
device tree file name of simulated PowerMac machine.

Name: `pmac-linux-kernel-loader.pmac-↪bootx.kernel-params` **Type:** `parameter`
Default: `/dev/ram0 rw` **Data type:** `string`

Description:
Linux kernel parameters.

Name: `pmac-linux-kernel-loader.pmac-↪bootx.ramdisk-filename` **Type:** `parameter`
Default: `initrd.img` **Data type:** `string`

Description:
initial ramdisk filename (either compressed with gzip or uncompressed).

Name: `pmac-linux-kernel-loader.pmac-↪bootx.screen-width` **Type:** `parameter`
Default: `0x00000280` **Data type:** `unsigned 32-bit integer`

Description:
screen width in pixels.

Name: `pmac-linux-kernel-loader.pmac-↪bootx.screen-height` **Type:** `parameter`
Default: `0x000001e0` **Data type:** `unsigned 32-bit integer`

Description:
screen height in pixels.

Name: `pmac-linux-kernel-loader.pmac-↪bootx.verbose` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable verbosity.

sdl

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

Description:
enable/disable verbosity while setup.

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

Description:
enable/disable verbosity while simulation.

Name: `sdl.refresh-period` **Type:** `parameter`
Default: `40` **Data type:** `unsigned 32-bit integer`

Description:
screen refresh period in milliseconds.

Name: `sdl.bmp-out-filename` **Type:** `parameter`
Default: **Data type:** `string`

Description:
if not empty implicitely enable screen capture and specify prefix of captured bitmaps (Windows DIB .bmp format).

Name: `sdl.keymap-filename` **Type:** `parameter`
Default: `pc_linux_fr_keymap.xml` **Data type:** `string`

Description:
host keymap filename.

Name: `sdl.host-key-name` **Type:** `parameter`
Default: `rctrl` **Data type:** `string`

Description:
host key to toggle mouse and keyboard grab.

Name: `sdl.force-refresh` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
force screen refresh every refresh period.

Name: `sdl.work-around-sdl-mouse-↪motion-coordinates-bug` **Type:** `parameter`
Default: `false` **Data type:** `boolean`
Valid: `true`, `false`

Description:
enable/disable work around SDL mouse motion coordinates bug.

1.6 Statistics

Simulation statistic counters are listed below:

cpu	
Name: `cpu.instruction-counter`	**Type:** `statistic` **Data type:** `unsigned 64-bit integer`
Description: number of simulated instructions.	
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 **Formula:** cpu.num-il1-misses / cpu.num-il1-accesses	**Type:** formula **Data type:** double precision floating-point
Name: cpu.dl1-miss-rate **Formula:** cpu.num-dl1-misses / cpu.num-dl1-accesses	**Type:** formula **Data type:** double precision floating-point
Name: cpu.l2-miss-rate **Formula:** cpu.num-l2-misses / cpu.num-l2-accesses	**Type:** formula **Data type:** double precision floating-point
Name: cpu.ibat-miss-rate **Formula:** cpu.num-ibat-misses / cpu.num-ibat-accesses	**Type:** formula **Data type:** double precision floating-point
Name: cpu.dbat-miss-rate **Formula:** cpu.num-dbat-misses / cpu.num-dbat-accesses	**Type:** formula **Data type:** double precision floating-point
Name: cpu.itlb-miss-rate **Formula:** cpu.num-itlb-misses / cpu.num-itlb-accesses	**Type:** formula **Data type:** double precision floating-point
Name: cpu.dtlb-miss-rate	**Type:** formula

Formula: cpu.num-dtlb-misses / cpu. ↪num-dtlb-accesses	**Data type:** double precision floating-point