

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 1.0beta3 on Sep 5 2012.

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

UNISIM `ppcemu-system` 1.0beta3

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Authors: Gilles Mouchard <gilles.mouchard@cea.fr>, Daniel Gracia Pérez <daniel.gracia-perez@cea.fr>

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
- **debugger**
- **erom**: Memory
- **flash**: This module implements an AM29LV800BT flash memory with the following characteristics:
 - Manufacturer ID: 0x010000
 - Device ID word #0: 0xda2202
 - 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
- **profiler**
- **sdl**: SDL (Simple DirectMedia Layer) wrapper
- **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]
- **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-1.0beta3 [<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 Default: true Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable inline debugger instantiation.	
Name: enable-press-enter-at-exit Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable pressing key enter at exit.	
Name: estimate-power Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable power estimators instantiation.	
Name: kernel_logger.file Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Keep logger output in a file.	
Name: kernel_logger.filename Default: logger_output.txt	Type: parameter Data type: string
Description: Filename to keep logger output _(the option file must be activated).	
Name: kernel_logger.std_err Default: true Valid: true, false	Type: parameter Data type: boolean
Description: Show logger output through the standard error output.	
Name: kernel_logger.std_err_color Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Colorize logger output through the standard error output _(only works if std_err is active).	
Name: kernel_logger.std_out Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Show logger output through the standard output.	

Name: kernel_logger.std_out_color Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Colorize logger output through the standard output _(only works if std_out is active).	
Name: kernel_logger.xml_file Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Keep logger output in a file xml formatted.	
Name: kernel_logger.xml_file_gzipped Default: false Valid: true, false	Type: parameter Data type: boolean
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 Default: logger_output.xml	Type: parameter Data type: string
Description: Filename to keep logger xml output _(the option xml_file must be activated).	
Name: message-spy Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable message spies instantiation.	
bus	
Name: bus.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: bus.cycle-time Default: 13333 ps	Type: parameter Data type: sc_time
Description: cycle time.	
cpu	
Name: cpu.cpu-cycle-time Default: 3333	Type: parameter Data type: unsigned 64-bit integer

Description: CPU cycle time in picoseconds.	
Name: cpu.voltage Default: 1300	Type: parameter Data type: unsigned 64-bit integer
Description: CPU voltage in mV.	
Name: cpu.max-inst Default: 18446744073709551615	Type: parameter Data type: unsigned 64-bit integer
Description: maximum number of instructions to simulate.	
Name: cpu.verbose-all Default: false Valid: true, false	Type: parameter Data type: boolean
Description: globally enable/disable verbosity.	
Name: cpu.verbose-setup Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity while setup.	
Name: cpu.verbose-step Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when simulating an instruction.	
Name: cpu.verbose-dtlb Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when accessing data translation lookahead buffer.	
Name: cpu.verbose-itlb Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when accessing instruction translation lookahead buffer.	

Name: cpu.verbose-dl1 Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when accessing L1 data cache.	
Name: cpu.verbose-ill Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when accessing L1 instruction cache.	
Name: cpu.verbose-l2 Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when accessing L2 unified cache.	
Name: cpu.verbose-load Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when simulating a load.	
Name: cpu.verbose-store Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when simulating a store.	
Name: cpu.verbose-read-memory Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when reading memory for a debug purpose.	
Name: cpu.verbose-write-memory Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when writing memory for a debug purpose.	
Name: cpu.verbose-exception Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when handling exceptions.	

Name: cpu.verbose-set-msr Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when setting MSR.	
Name: cpu.verbose-set-hid0 Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when setting HID0.	
Name: cpu.verbose-set-hid1 Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when setting HID1.	
Name: cpu.verbose-set-hid2 Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when setting HID2.	
Name: cpu.verbose-set-l2cr Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity when setting L2CR.	
Name: cpu.enable-linux-printk-snooping Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable linux printk buffer snooping.	
Name: cpu.enable-linux-syscall-snooping Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable linux syscall snooping.	
Name: cpu.trap-on-instruction-counter Default: 18446744073709551615	Type: parameter Data type: unsigned 64-bit integer
Description: number of simulated instruction before trapping.	

Name: <code>cpu.halt-on</code> Default:	Type: parameter Data type: string
Description: Symbol or address where to stop simulation.	
Name: <code>cpu.bus-cycle-time</code> Default: 13333 ps	Type: parameter Data type: <code>sc_time</code>
Description: bus cycle time.	
Name: <code>cpu.nice-time</code> Default: 1 ms	Type: parameter Data type: <code>sc_time</code>
Description: maximum time between synchronizations.	
Name: <code>cpu.ipc</code> Default: 1	Type: parameter Data type: double precision floating-point
Description: targeted average instructions per second.	
debugger	
Name: <code>debugger.verbose</code> Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable verbosity.	
Name: <code>debugger.dwarf-to-html-output- ↔directory</code> Default:	Type: parameter Data type: string
Description: DWARF v2/v3 to HTML output directory.	
Name: <code>debugger.dwarf-register-number- ↔mapping-filename</code> Default: <code>powerpc_eabi_gcc_dwarf_register_</code> <code>↔number_mapping.xml</code>	Type: parameter Data type: string
Description: DWARF register number mapping filename.	

Name: debugger.parse-dwarf Default: true Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable parsing of DWARF debugging informations.	
erom	
Name: erom.org Default: 0x78000000	Type: parameter Data type: unsigned 32-bit integer
Description: memory origin/base address.	
Name: erom.bytesize Default: 16777216	Type: parameter Data type: unsigned 32-bit integer
Description: memory size in bytes.	
Name: erom.initial-byte-value Default: 0x00	Type: parameter Data type: unsigned 8-bit integer
Name: erom.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: erom.cycle-time Default: 13333 ps	Type: parameter Data type: sc_time
Description: RAM memory cycle time.	
flash	
Name: flash.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: flash.org Default: 0xff800000	Type: parameter Data type: unsigned 32-bit integer
Description: flash memory base address.	

Name: flash.bytesize Default: 8388608	Type: parameter Data type: unsigned 32-bit integer
Description: flash memory size in bytes.	
Name: flash.endian Default: big-endian Valid: little-endian, big-endian	Type: parameter Data type: endianness
Description: endianness of flash memory.	
Name: flash.sector-protect[0] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect[1] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect[2] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect[3] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect[4] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect[5] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	

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

Name: flash.sector-protect [14] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect [15] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect [16] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect [17] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.sector-protect [18] Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable sector write protection.	
Name: flash.fsm-to-graphviz-output- ↪filename Default:	Type: parameter Data type: string
Description: FSM (finite state machine) to Graphviz output filename.	
Name: flash.cycle-time Default: 13333 ps	Type: parameter Data type: sc_time
Description: flash memory cycle time.	
gdb-server	
Name: gdb-server.memory-atom-size Default: 0x00000001	Type: parameter Data type: unsigned 32-bit integer

Description: size of the smallest addressable element in memory.	
Name: gdb-server.tcp-port Default: 1234	Type: parameter Data type: signed 32-bit integer
Description: TCP/IP port to listen waiting for a GDB client connection.	
Name: gdb-server.architecture-description ↔filename Default: gdb_powerpc.xml	Type: parameter Data type: string
Description: filename of a XML description of the connected processor.	
Name: gdb-server.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable verbosity.	
heathrow	
Name: heathrow.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: heathrow.initial-base-addr Default: 0xf3000000	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of memory space.	
Name: heathrow.pci-device-number Default: 0x00000001	Type: parameter Data type: unsigned 32-bit integer
Description: PCI device number.	
Name: heathrow.bus-frequency Default: 33	Type: parameter Data type: unsigned 32-bit integer
Description: bus frequency in Mhz.	

Name: heathrow.pci-bus-frequency Default: 33	Type: parameter Data type: unsigned 32-bit integer
Description: PCI bus frequency in Mhz.	
i8042	
Name: i8042.isa-bus-frequency Default: 8	Type: parameter Data type: unsigned 32-bit integer
Description: ISA bus frequency in Mhz.	
Name: i8042.fsb-frequency Default: 75	Type: parameter Data type: unsigned 32-bit integer
Description: front side bus frequency in Mhz.	
Name: i8042.typematic-rate Default: 30	Type: parameter Data type: double precision floating-point
Description: typematic rate (key strokes per second).	
Name: i8042.typematic-delay Default: 0.25	Type: parameter Data type: double precision floating-point
Description: typematic delay (key repeat delay in seconds).	
Name: i8042.speed-boost Default: 30	Type: parameter Data type: double precision floating-point
Description: speed-boost factor.	
Name: i8042.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
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.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.	
Name: inline-debugger.architecture- ↔description-filename	Type: parameter
Default:	Data type: string
Description: filename of a XML description of the connected processor.	
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.initial-byte-value	Type: parameter
Default: 0x00	Data type: unsigned 8-bit integer

Name: memory.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: memory.cycle-time Default: 13333 ps	Type: parameter Data type: sc.time
Description: RAM memory cycle time.	
mpc107	
Name: mpc107.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: mpc107.host_mode Default: true Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable host mode.	
Name: mpc107.a_address_map Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable address map A.	
Name: mpc107.memory_32bit_data_bus_↔size Default: true Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable 32-bit data bus width.	
Name: mpc107.rom0_8bit_data_bus_↔size Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable rom #0 8-bit data bus width.	
Name: mpc107.rom1_8bit_data_bus_↔size	Type: parameter

Default: false Valid: true, false	Data type: boolean
Description: enable/disable rom #1 8-bit data bus width.	
Name: mpc107.frequency Default: 75	Type: parameter Data type: unsigned 32-bit integer
Description: frequency in Mhz.	
Name: mpc107.sdram_cycle_time Default: 13333	Type: parameter Data type: unsigned 64-bit integer
Description: SDRAM cycle time in picoseconds.	
mpc107.DMA	
Name: mpc107.DMA.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable verbosity.	
mpc107.address_mapper	
Name: mpc107.address_mapper.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
mpc107.atu	
Name: mpc107.atu.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
mpc107.epic	
Name: mpc107.epic.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
mpc107.pci_controller	
Name: mpc107.pci_controller.verbose	Type: parameter

Default: false Valid: true, false	Data type: boolean
Description: enable/disable verbosity.	
pci-bus	
Name: pci-bus.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: pci-bus.num-mappings Default: 10	Type: parameter Data type: unsigned 32-bit integer
Description: total number of address mappings.	
Name: pci-bus.base-address [0] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.base-address [1] Default: 0xf3000000	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.base-address [2] Default: 0x00018100	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.base-address [3] Default: 0x00018108	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.base-address [4] Default: 0x00000004	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	

Name: pci-bus.base-address[5] Default: 0x0000000c	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.base-address[6] Default: 0x00018118	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.base-address[7] Default: 0xa0000000	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.base-address[8] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.base-address[9] Default: 0x000a0000	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: base address of mapped device.	
Name: pci-bus.size[0] Default: 1073741824	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.size[1] Default: 524288	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.size[2] Default: 8	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	

Name: pci-bus.size[3] Default: 4	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.size[4] Default: 8	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.size[5] Default: 4	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.size[6] Default: 16	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.size[7] Default: 8388608	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.size[8] Default: 65536	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.size[9] Default: 393216	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: size in bytes of mapped device.	
Name: pci-bus.device-number[0] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	

Name: pci-bus.device-number [1] Default: 0x00000001	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	
Name: pci-bus.device-number [2] Default: 0x00000002	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	
Name: pci-bus.device-number [3] Default: 0x00000002	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	
Name: pci-bus.device-number [4] Default: 0x00000002	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	
Name: pci-bus.device-number [5] Default: 0x00000002	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	
Name: pci-bus.device-number [6] Default: 0x00000002	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	
Name: pci-bus.device-number [7] Default: 0x00000003	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	
Name: pci-bus.device-number [8] Default: 0x00000004	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	

Name: pci-bus.device-number [9] Default: 0x00000004	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: device number.	
Name: pci-bus.target-port [0] Default: 0	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.target-port [1] Default: 1	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.target-port [2] Default: 2	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.target-port [3] Default: 2	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.target-port [4] Default: 2	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.target-port [5] Default: 2	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.target-port [6] Default: 2	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	

Name: pci-bus.target-port [7] Default: 3	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.target-port [8] Default: 4	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.target-port [9] Default: 4	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: target port number.	
Name: pci-bus.register-number [0] Default: 0x00000010	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.register-number [1] Default: 0x00000010	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.register-number [2] Default: 0x00000010	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.register-number [3] Default: 0x00000014	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.register-number [4] Default: 0x00000018	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	

Name: pci-bus.register-number [5] Default: 0x0000001c	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.register-number [6] Default: 0x00000020	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.register-number [7] Default: 0x00000010	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.register-number [8] Default: 0x00000010	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.register-number [9] Default: 0x00000014	Type: parameter Data type: unsigned 32-bit integer
Description: mapping: BAR offset in PCI device configuration space.	
Name: pci-bus.addr-type [0] Default: mem Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.addr-type [1] Default: mem Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.addr-type [2] Default: i/o Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	

Name: pci-bus.addr-type[3] Default: i/o Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.addr-type[4] Default: i/o Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.addr-type[5] Default: i/o Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.addr-type[6] Default: i/o Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.addr-type[7] Default: mem Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.addr-type[8] Default: i/o Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.addr-type[9] Default: mem Valid: mem, i/o, cfg	Type: parameter Data type: pci space
Description: mapping: address space type.	
Name: pci-bus.frequency Default: 33	Type: parameter Data type: unsigned 32-bit integer
Description: frequency in Mhz.	

pci-display	
Name: pci-display.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: pci-display.width Default: 640	Type: parameter Data type: unsigned 32-bit integer
Description: screen width in pixels.	
Name: pci-display.height Default: 480	Type: parameter Data type: unsigned 32-bit integer
Description: screen height in pixels.	
Name: pci-display.depth Default: 15	Type: parameter Data type: unsigned 32-bit integer
Description: screen depth in bits per pixel.	
Name: pci-display.bytesize Default: 8388608	Type: parameter Data type: unsigned 32-bit integer
Description: frame buffer size in bytes.	
Name: pci-display.initial-base-addr Default: 0xa0000000	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of memory space.	
Name: pci-display.pci-device-number Default: 0x00000003	Type: parameter Data type: unsigned 32-bit integer
Description: PCI device number.	
Name: pci-display.pci-bus-frequency Default: 0x00000021	Type: parameter Data type: unsigned 32-bit integer

Description: PCI bus frequency.	
pci-ide	
Name: pci-ide.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Name: pci-ide.base-address[0] Default: 0x00018101	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of memory space.	
Name: pci-ide.base-address[1] Default: 0x00018109	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of memory space.	
Name: pci-ide.base-address[2] Default: 0x00000005	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of memory space.	
Name: pci-ide.base-address[3] Default: 0x0000000d	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of memory space.	
Name: pci-ide.base-address[4] Default: 0x00018119	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of memory space.	
Name: pci-ide.size[0] Default: 0x00000008	Type: parameter Data type: unsigned 32-bit integer
Description: size in bytes of memory space.	
Name: pci-ide.size[1] Default: 0x00000004	Type: parameter Data type: unsigned 32-bit integer
Description: size in bytes of memory space.	

Name: pci-ide.size[2] Default: 0x00000008	Type: parameter Data type: unsigned 32-bit integer
Description: size in bytes of memory space.	
Name: pci-ide.size[3] Default: 0x00000004	Type: parameter Data type: unsigned 32-bit integer
Description: size in bytes of memory space.	
Name: pci-ide.size[4] Default: 0x00000010	Type: parameter Data type: unsigned 32-bit integer
Description: size in bytes of memory space.	
Name: pci-ide.register-number[0] Default: 0x00000010	Type: parameter Data type: unsigned 32-bit integer
Description: BAR offset in PCI configuration space.	
Name: pci-ide.register-number[1] Default: 0x00000014	Type: parameter Data type: unsigned 32-bit integer
Description: BAR offset in PCI configuration space.	
Name: pci-ide.register-number[2] Default: 0x00000018	Type: parameter Data type: unsigned 32-bit integer
Description: BAR offset in PCI configuration space.	
Name: pci-ide.register-number[3] Default: 0x0000001c	Type: parameter Data type: unsigned 32-bit integer
Description: BAR offset in PCI configuration space.	
Name: pci-ide.register-number[4] Default: 0x00000020	Type: parameter Data type: unsigned 32-bit integer
Description: BAR offset in PCI configuration space.	

Name: pci-ide.device-number Default: 0x00000002	Type: parameter Data type: unsigned 32-bit integer
Description: PCI device number.	
Name: pci-ide.disk-image[0] Default:	Type: parameter Data type: string
Description: Raw disk image filename.	
Name: pci-ide.disk-image[1] Default:	Type: parameter Data type: string
Description: Raw disk image filename.	
Name: pci-ide.disk-image[2] Default:	Type: parameter Data type: string
Description: Raw disk image filename.	
Name: pci-ide.disk-channel[0] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: disk channel.	
Name: pci-ide.disk-channel[1] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: disk channel.	
Name: pci-ide.disk-channel[2] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: disk channel.	
Name: pci-ide.disk-num[0] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: disk number (0=master 1=slave).	

Name: pci-ide.disk-num[1] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: disk number (0=master 1=slave).	
Name: pci-ide.disk-num[2] Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: disk number (0=master 1=slave).	
pci-isa-bridge	
Name: pci-isa-bridge.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity.	
Name: pci-isa-bridge.initial-base- ↔addr Default: 0x000a0000	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of memory space.	
Name: pci-isa-bridge.initial-io- ↔base-addr Default: 0x00000000	Type: parameter Data type: unsigned 32-bit integer
Description: initial base address of I/O space.	
Name: pci-isa-bridge.pci-device- ↔number Default: 0x00000004	Type: parameter Data type: unsigned 32-bit integer
Description: PCI device number.	
Name: pci-isa-bridge.isa-bus-frequency Default: 8	Type: parameter 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.dwarf-register-number- ↔mapping-filename	Type: parameter
Default:	Data type: string
Description: DWARF register number mapping filename.	
Name: pmac-linux-kernel-loader.elf32- ↔loader.parse-dwarf	Type: parameter
Default: false	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.	
profiler	
Name: profiler.min-data-read-prof- ↔addr	Type: parameter
Default: 0x00000000	Data type: unsigned 32-bit integer
Description: Minimum address for data read profiling.	
Name: profiler.max-data-read-prof- ↔addr	Type: parameter
Default: 0xffffffff	Data type: unsigned 32-bit integer
Description: Maximum address for data read profiling.	
Name: profiler.min-data-write-prof- ↔addr	Type: parameter

Default: 0x00000000	Data type: unsigned 32-bit integer
Description: Minimum address for data write profiling.	
Name: profiler.max-data-write-prof- ↔addr	Type: parameter
Default: 0xffffffff	Data type: unsigned 32-bit integer
Description: Maximum address for data write profiling.	
Name: profiler.min-insn-fetch-prof- ↔addr	Type: parameter
Default: 0x00000000	Data type: unsigned 32-bit integer
Description: Minimum address for instruction fetch profiling.	
Name: profiler.max-insn-fetch-prof- ↔addr	Type: parameter
Default: 0xffffffff	Data type: unsigned 32-bit integer
Description: Maximum address for instruction fetch profiling.	
Name: profiler.min-insn-exec-prof- ↔addr	Type: parameter
Default: 0x00000000	Data type: unsigned 32-bit integer
Description: Minimum address for instruction execution profiling.	
Name: profiler.max-insn-exec-prof- ↔addr	Type: parameter
Default: 0xffffffff	Data type: unsigned 32-bit integer
Description: Maximum address for instruction execution profiling.	
Name: profiler.enable-data-read- ↔prof	Type: parameter
Default: false	Data type: boolean
Valid: true, false	
Description: Enable/Disable data read profiling.	

Name: profiler.enable-data-write- ↔prof Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable data write profiling.	
Name: profiler.enable-insn-fetch- ↔prof Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable instruction fetch profiling.	
Name: profiler.enable-insn-exec- ↔prof Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable instruction execution profiling.	
Name: profiler.verbose Default: false Valid: true, false	Type: parameter Data type: boolean
Description: Enable/Disable verbosity.	
sdl	
Name: sdl.verbose-setup Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity while setup.	
Name: sdl.verbose-run Default: false Valid: true, false	Type: parameter Data type: boolean
Description: enable/disable verbosity while simulation.	
Name: sdl.refresh-period Default: 40	Type: parameter 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 implicitly enable screen capture and specify prefix of captured bitmaps (Windows DIB .bmp format).	
Name: sdl.keymap-filename Default: pc_linux_fr_keymap.xml	Type: parameter Data type: string
Description: host keymap filename.	
Name: sdl.host-key-name Default: rctrl	Type: parameter Data type: string
Description: host key to toggle mouse and keyboard grab.	
Name: sdl.force-refresh Default: false Valid: true, false	Type: parameter Data type: boolean
Description: force screen refresh every refresh period.	
Name: sdl.work-around-sdl-mouse- ↔motion-coordinates-bug Default: false Valid: true, false	Type: parameter Data type: boolean
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-ill-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: <code>cpu.num-dbat-misses</code>	Type: statistic Data type: unsigned 64-bit integer
Description: number of misses to DBATs.	
Name: <code>cpu.num-itlb-accesses</code>	Type: statistic Data type: unsigned 64-bit integer
Description: number of accesses to ITLB.	
Name: <code>cpu.num-itlb-misses</code>	Type: statistic Data type: unsigned 64-bit integer
Description: number of misses to ITLB.	
Name: <code>cpu.num-dtlb-accesses</code>	Type: statistic Data type: unsigned 64-bit integer
Description: number of accesses to DTLB.	
Name: <code>cpu.num-dtlb-misses</code>	Type: statistic Data type: unsigned 64-bit integer
Description: number of misses to DTLB.	

1.7 Formulas

Simulation statistic formulas are listed below:

cpu		
Name: <code>cpu.il1-miss-rate</code>	Type: formula	
Formula: <code>cpu.num-il1-misses / cpu.↔num-il1-accesses</code>	Data type: floating-point	double precision
Name: <code>cpu.dl1-miss-rate</code>	Type: formula	
Formula: <code>cpu.num-dl1-misses / cpu.↔num-dl1-accesses</code>	Data type: floating-point	double precision
Name: <code>cpu.l2-miss-rate</code>	Type: formula	
Formula: <code>cpu.num-l2-misses / cpu.↔num-l2-accesses</code>	Data type: floating-point	double precision

Name: cpu.ibat-miss-rate	Type: formula	
Formula: $\text{cpu.num-ibat-misses} / \text{cpu.} \leftarrow \text{num-ibat-accesses}$	Data type: floating-point	double precision
Name: cpu.dbat-miss-rate	Type: formula	
Formula: $\text{cpu.num-dbat-misses} / \text{cpu.} \leftarrow \text{num-dbat-accesses}$	Data type: floating-point	double precision
Name: cpu.itlb-miss-rate	Type: formula	
Formula: $\text{cpu.num-itlb-misses} / \text{cpu.} \leftarrow \text{num-itlb-accesses}$	Data type: floating-point	double precision
Name: cpu.dtlb-miss-rate	Type: formula	
Formula: $\text{cpu.num-dtlb-misses} / \text{cpu.} \leftarrow \text{num-dtlb-accesses}$	Data type: floating-point	double precision