Data sheet – TEMU

Terma Emulator

The Terma Emulator (TEMU) is a full system simulation framework. It consists of a suite of instruction-level emulators of the SPARCv8 (ERC32, LEON2, LEON3, LEON4) and ARMv7-R processors, including associated peripherals. TEMU supports the emulation of multi-core processors. It is provided as a stand-alone application as well as a set of libraries that can be integrated in an existing simulator.
TEMU is based on the LLVM framework enabling the application of custom domain specific optimizations and transformations of the emulator-core. EMU offers very high performance.

USAGE

TEMU runs unmodified operating systems (e.g. RTEMS and Linux) and application software. TEMU is suitable for software debugging and development, software validation facilities and operational simulators.

PROCESSOR MODELS

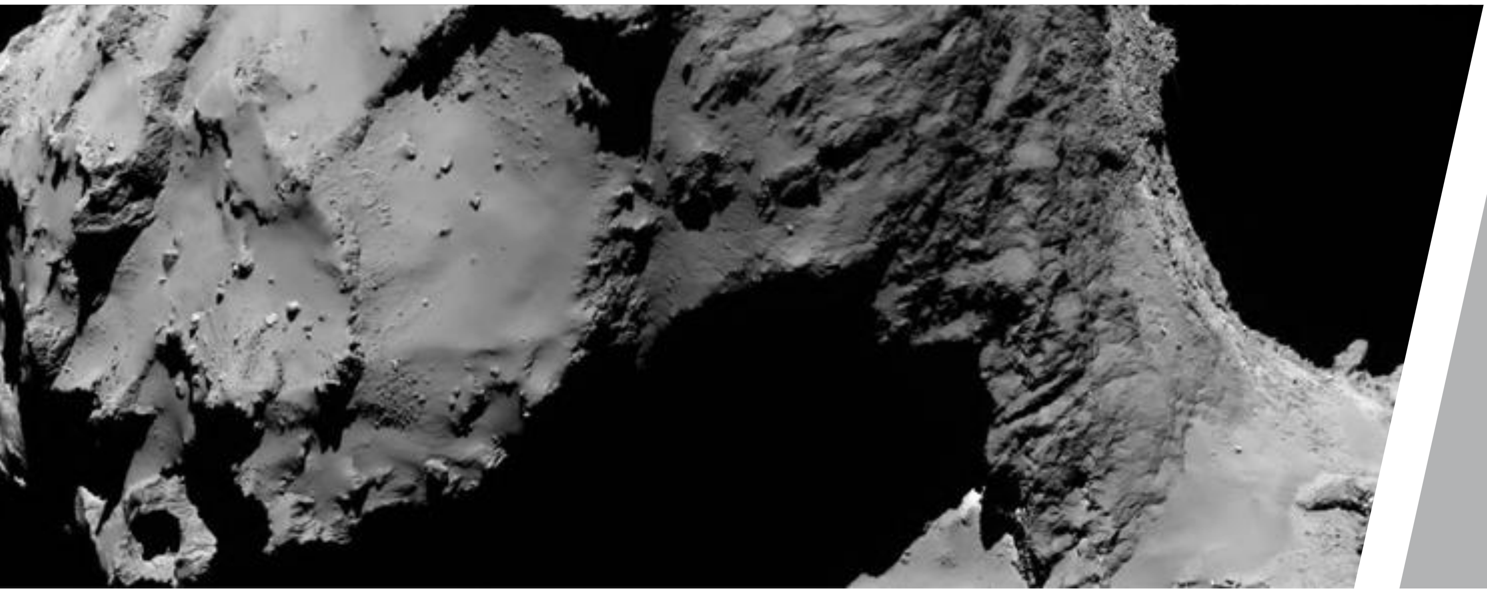
Several processor models are included, including the **SPARCv8** based ERC32, LEON2 (AT697), LEON3 (UT699, UT700 etc), LEON4 (GR740). **ARMv7** support includes the TMS570. Additional architectures can be supported on request.

MULTI-CORE AND MULTI-SYSTEM EMULATION

A user can define systems with an arbitrary number of processors or use one of the default configurations.

PERIPHERAL MODELS

TEMU comes with several bundled peripheral models, including the MEC, LEON2 on-chip devices and many GRLIB devices (timers, UARTs interrupt controllers, bus controllers), and TMS570 devices such as RTI, VIM and SCI.



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BUS MODELS

Multiple transactional bus models are built in. It includes serial ports, GPIO, MIL-STD-1553A/B, CAN and SpaceWire. Additional bus models can be added either by the user or by Terma. Controllers and remote terminal models can easily be implemented by the user using the bus model APIs.

TIMING ACCURACY

Each processor core has a static timing model, and can be connected to built-in or custom cache models. Both exact content models and statistical models can be used.

PERFORMANCE

The emulator core is written using the LLVM framework, using custom domain specific compiler optimisations and the full suite of LLVM optimisations. The emulator is further optimized using threaded code, idle loop detection, power down mode support etc.

SOFTWARE DEBUGGING SUPPORT

TEMU comes with an automatable command line interface. It is capable of **non-intrusive source and assembler level software debugging** using DWARF information from the debugged software, and a **GDB RSP** (Remote Serial Protocol) server. This enables the use of existing GDB based debuggers, including graphical debuggers such as DDD and Eclipse. TEMU is fully deterministic, meaning that the user can be confident that behavior is repeatable.

PLUG-IN SUPPORT AND EMULATOR EMBEDDING

There is a fully featured Application Programmer Interface (API) that supports memory mapped devices, data buses, remote terminals and environmental models. The API supports the integration or embedding of TEMU in existing simulators, in this case TEMU is used as a software library.

AUTOMATION LANGUAGE

TEMU script provides a specific language driving the TEMU command line interface, this interface can be scripted.
Python provides access to much of the TEMU C-API.

OPERATING SYSTEMS

Linux®: Works on all recent distributions, specific distributions can be supported if needed. RPM and DEB installers provided in addition to plain tarballs.
macOS®: TEMU can run on recent versions of macOS.
Windows®: TEMU can be made available for Windows if needed.

SOFTWARE PLATFORM

C++11 based internals. Public API is exposed as C11.
No GPL or other copy-left licensed code or libraries used.

IPR owned by Terma, no export restrictions.

SUPPORT

Standard license price includes 1 year warranty & email support. Standard on-site training packages available on request.

More information from http://tgss.terma.com