Evariste III: A new multi-FPGA system for fair benchmarking of hardware dependent cryptographic primitives

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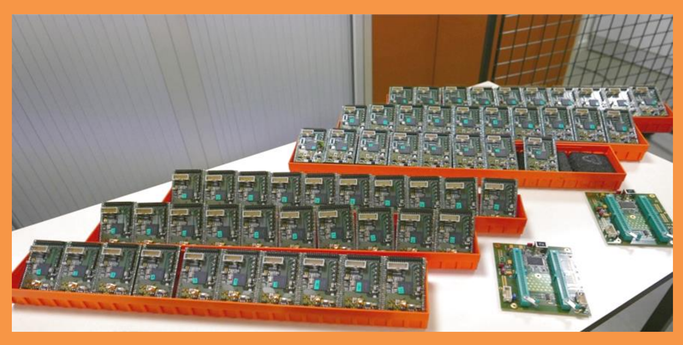
Laboratoire Hubert Curien, UMR 5516 CNRS - Université Jean Monnet, Saint-Etienne, France

What's new?

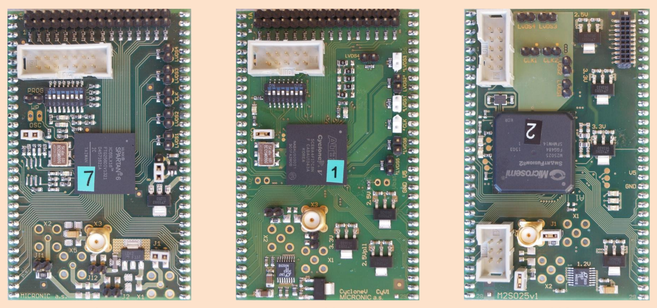
- 3 new FPGA modules, one with an embedded ARM processor
- Motherboard with ZIF (zero insertion force) connectors
- Serial connection of up to 6 modules via JTAG
- Box with 6 motherboards interconnected and chained
- 30 modules of each new FPGA family for PUF evaluation available
- SMA connectors in all modules for side channel analysis added



Inherited from Evariste II[1]

- Both scripting and fast acquisition data programs
- Open source system
- Remotely available via Internet
- Fast USB interface

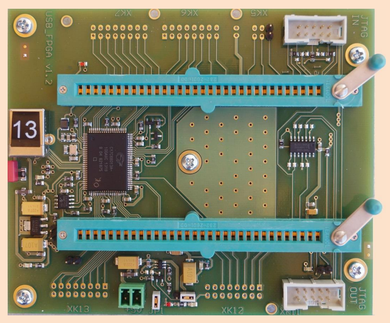
3 new modules:



I. II. III.

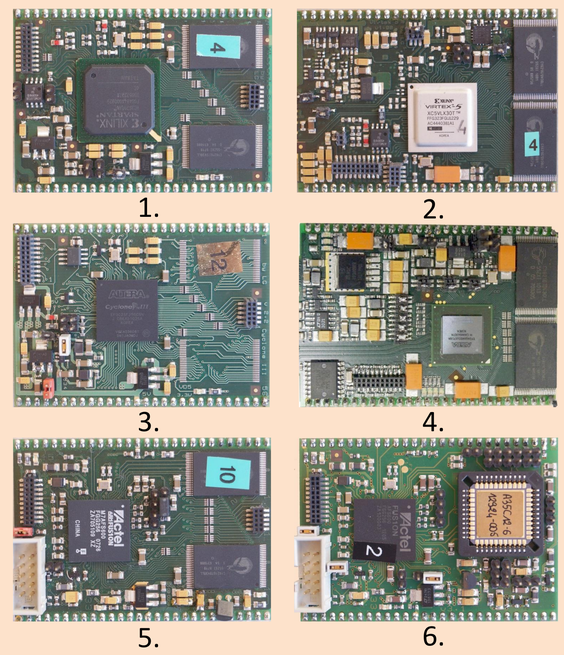
I. Xillinx Spartan 6
II. Altera Cyclone V
III. Microsemi SmartFusion2 with ARM Cortex-M3

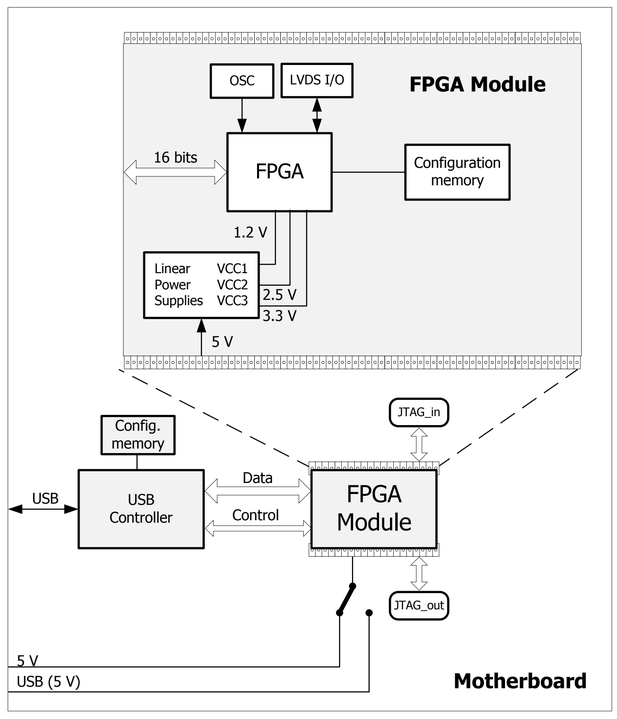
- New motherboard
  - ZIF connectors
  - JTAG chain I/O



Compatible with old modules:

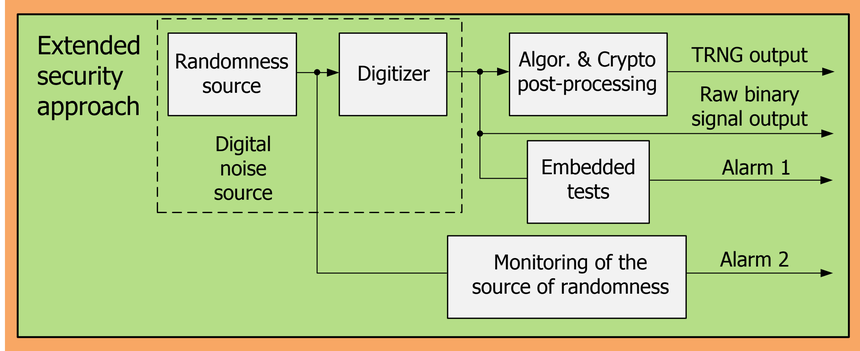
1. Xillinx Spartan 3
2. Xilinx Virtex V
3. Altera Cyclone III (3 versions)
4. Altera Aria II
5. Microsemi Fusion (2 versions)
6. ASIC controlled with Fusion FPGA





TRNGs

System dedicated to True Random Number Generators

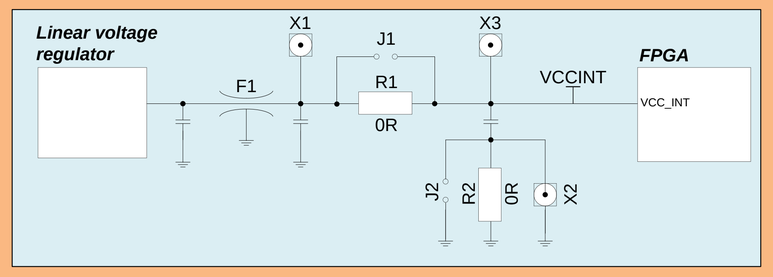


First historical application, fair TRNG comparison thanks to:

- Unified hardware platform for different FPGA and ASIC technologies
- Linear power supply
- High quality low pass filters

SCAs

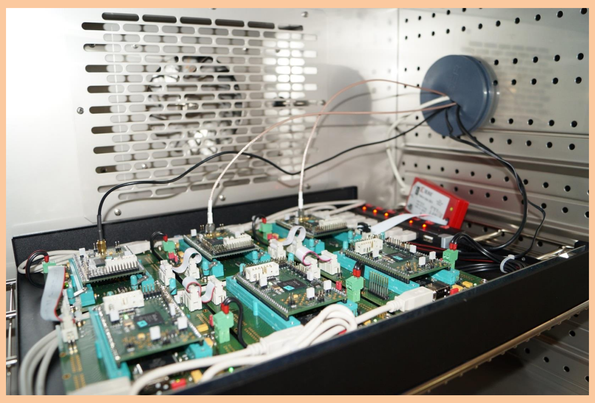
System dedicated to Side Channel Analyses



- Access to power supply lines in different places of the design
- SMA connectors for easier access and performance
- Embedded ARM processor in new modules to study software primitives

PUFs

System dedicated to Physical Unclonable Functions



- Evaluation of up to 6 modules in parallel with 6 motherboards placed in a box
- JTAG chain for reconfiguration in situ
- Zero insertion force connectors to facilitate exchange of modules

1. FISCHER V. , HADDAD P., BERNARD F., (2013) :
« *An open-source multi-FPGA modular system for fair benchmarking of true random number generators* »,
23rd international conference on field programmable logic and applications (FPL2013), pp. PS3_8, Porto, Portugal

http://labh-curien.univ-st-etienne.fr/wiki-evariste/

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ANR 2013 call: SALWARE - Salutary hardware design to fight against integrated circuit counterfeiting and theft - ANR-13-JS03-0003.
NATO SfP (Science for Peace) 2013: SFPP 984520 "Secure implementation of post-quantum cryptography".