

# **URLAP Current state & future work**

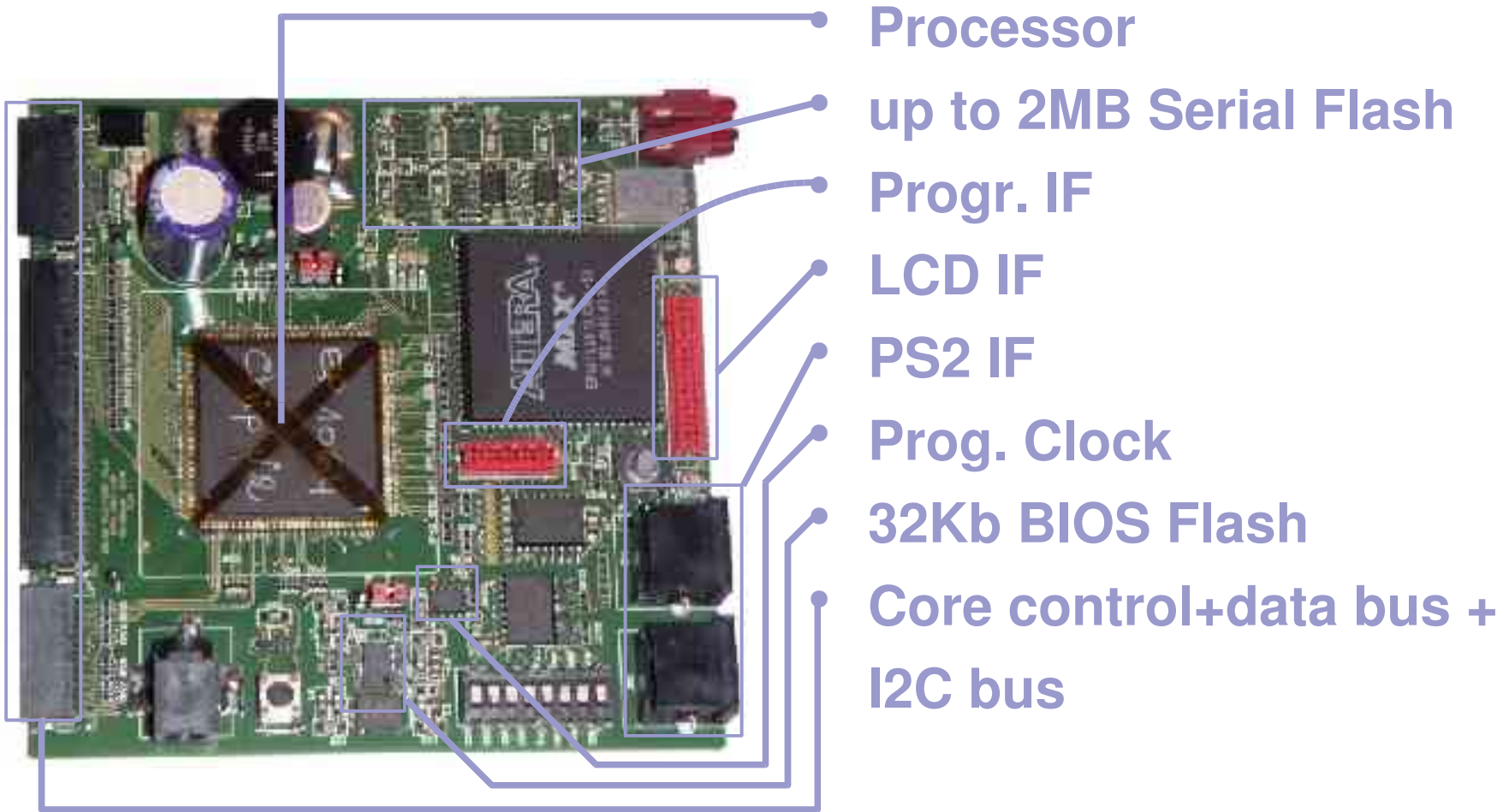
**C. Favi**

**August 2<sup>nd</sup> 2005**

# Outline

- **Hardware**
  - URLAP Main Board
  - URLAP Extension Board
  - URLAP Watch
- **Software**
  - GNU Toolchain
  - Emulator
  - Support software
  - BIOS
  - Test programs
  - Terminal
  - Bugs
- **Planned Current/Future work**

# URLAP Main board



# URLAP Extension board



- **8 MB RAM** (Cypress CY7C1049CV33)
- **2 CPLDs** (Xilinx XCR3128XL)
  - **Core addr & data bus interfacing**
    - mem access
    - fpga reconfigurability

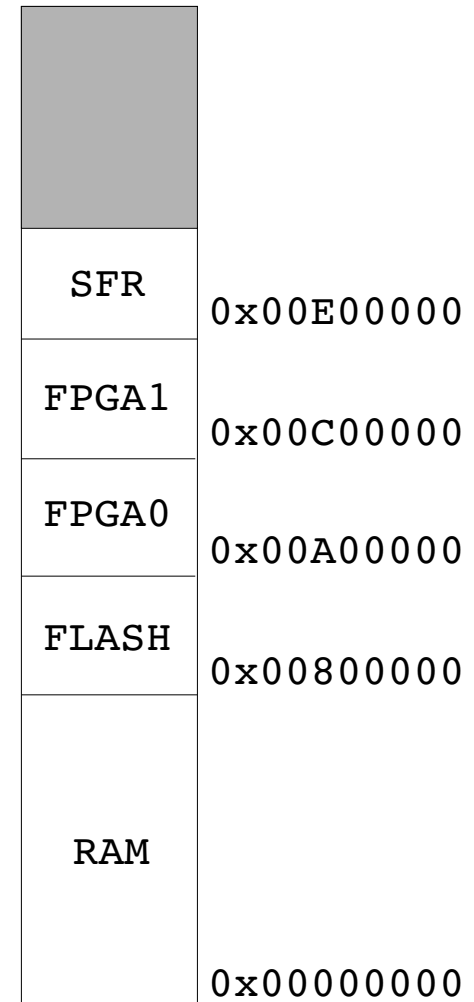
# URLAP Extension board

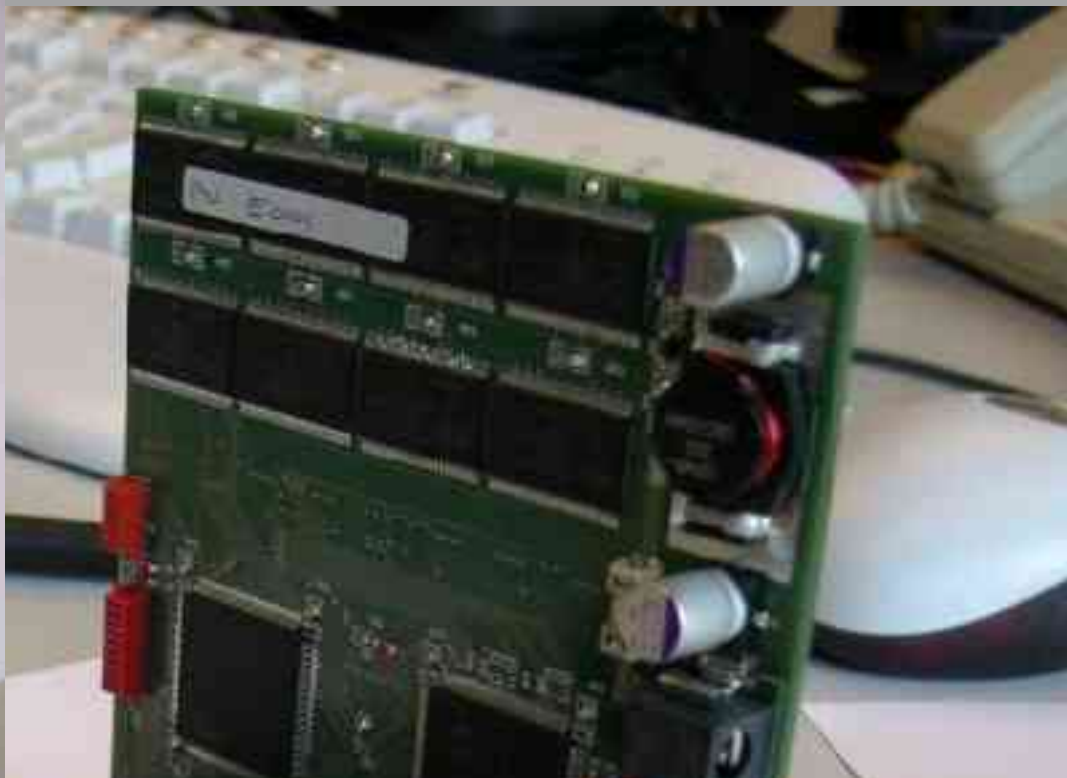
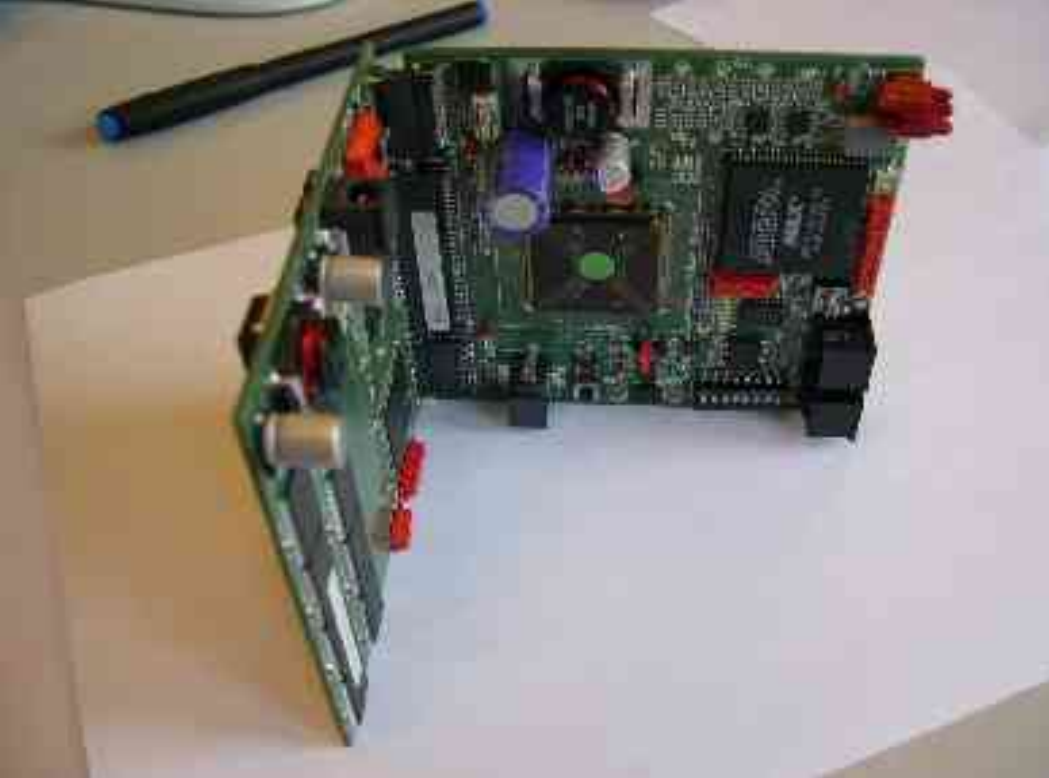


- **512KB // Flash** (ST M29W040B)
- **2 FPGA** (Xilinx XCS30XL)
  - 8 GIO pins / FPGA
  - 2 x UART level TX/RX
  - I2C bus connection

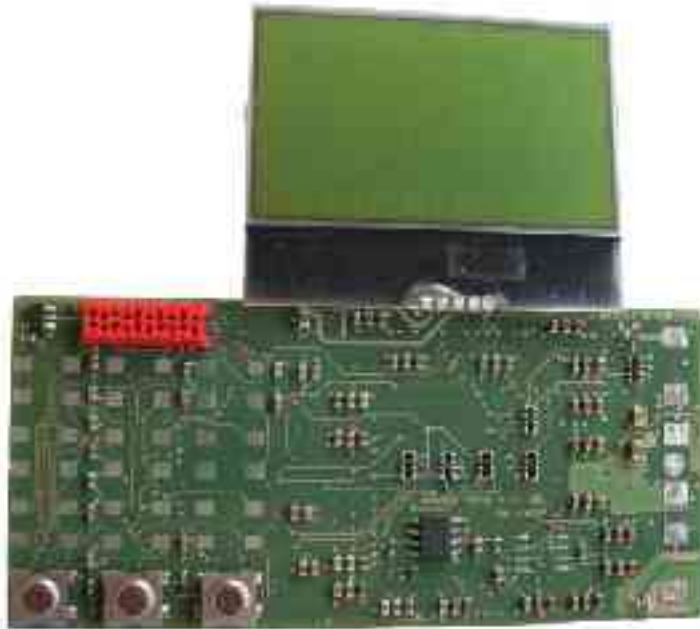
# Mainboard + Extension

- Implemented:
  - full (word, halfword, byte) access to RAM
  - byte access to FLASH
  - at boot up: copy of FLASH into RAM
  - FPGA reprogramming (through SFR mmap)
- FPGA interfacing:
  - copro
  - mmaped





# URLAP Watch



- RF Interface
- keyboard
- LCD display
- Uses internal chip ring oscillator (5MHz)



# GNU Toolchain

- gcc 3.4.3
- binutils 2.15
- Support for C/C++ development

# Emulator

- **Cycle- and bit-true C model of :**
  - Core
  - profiling copro
  - debug copro
  - partial LKM copro support (LCD part)
  - emulates full memory range (2GB)
- **to be done:**
  - SPI copro
  - full LKM copro

# Support Software

- `urlap_bios_utility`
- `urlap_clock_utility`
- `urlap_mp25p20_flash_utility`
- `urlap_check_parallel_expanders`
- `urlap_scan_i2c_bus`
- `urlap_jtag_detect`
- `urlap_elf2bin`
- `urlap_elf2flash`
- `urlap_ps2adapter_programmer`

# BIOS

- initialize the processor
- run first program found in serial flash
- provide shared routines through SWI
  - printf
  - load programs from serial flash
  - execute program
  - enable/disable IRQs
  - getc

# Test programs

- graph\_demo
- memtest
- lkmtest\*
- spitest\*
- ps2 if tests
- extmemtest
- external flash programming

# Terminal

- **simple command interpreter**
  - **ls**
  - **run**
  - **dbg (limited support)**
  - **help**
  - **exit**

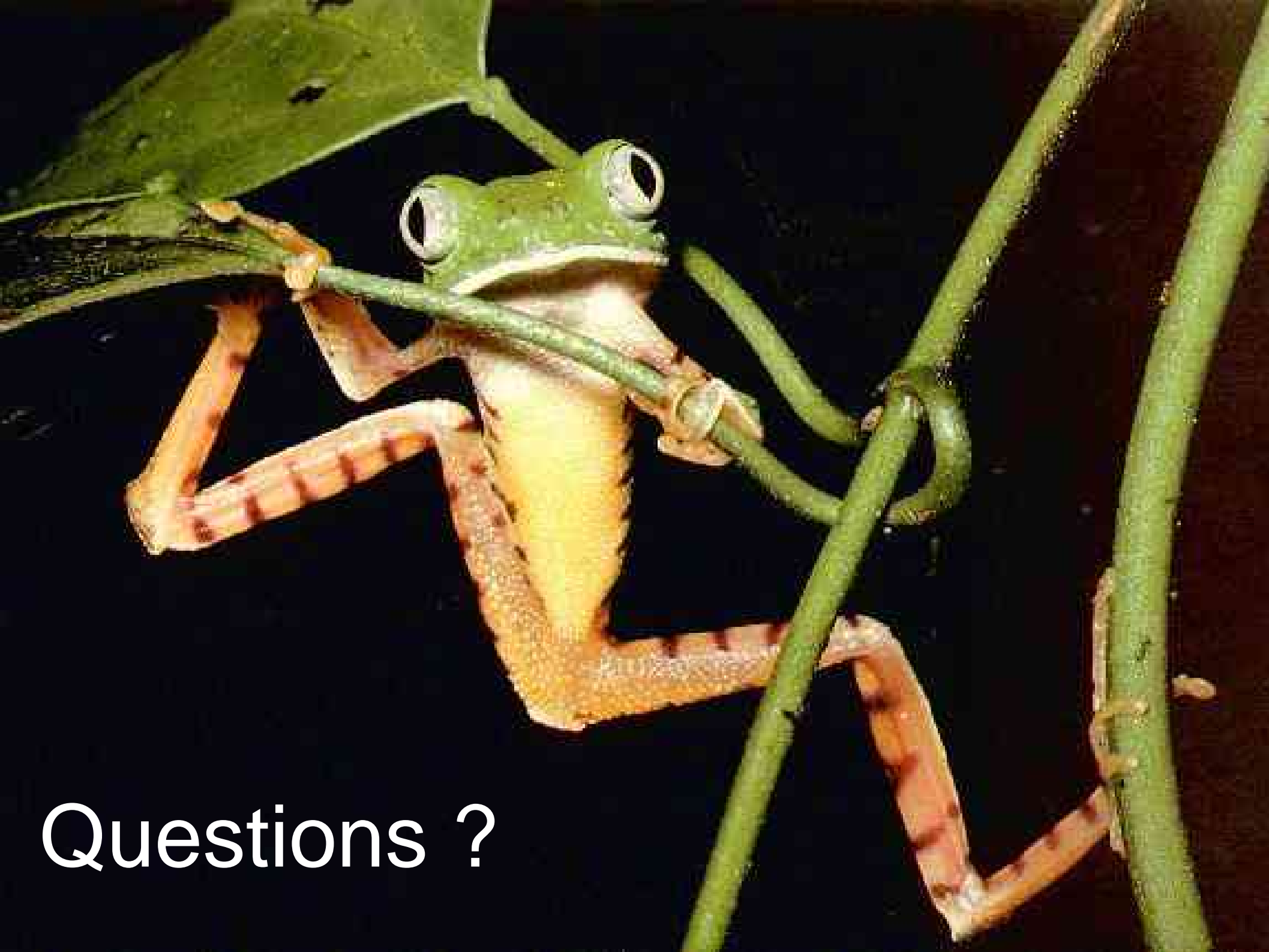
# Bugs

- PS/2 timing bug
- IRQ
- Profiling copro
- some processor instr. (bic, {ldc, stc}, {ldm, stm}) not fully working (but workarounds in toolchain integrated)
- JTAG not functioning
- some bugs in gcc (some fixed some not yet)



# Planned Current/Future work

- eCos [Claudio]
  - UART implementation in FPGA
- power management in FPGA
- reconfigurable computing
- Multi-Processor platform (next presentation by T. Kluter)



Questions ?