Damage to FPGAs

- Can we damage FPGAs accidentally?
- How
- How to prevent it!

Damage to FPGAs

- For all things that are flexible, the chances of inadvertent failure are increased.
  - **Design Practice**
    - Internal buses enabled by external signals
      - contention
    - Thermal consideration
      - Maximum power dissipation of the package
  - **Generate incorrect bit files!**
    - I/O fixed on the board.
      - use the correct pin allocation file
    - Configurations must take into account interconnection to other devices on the board

Damage to FPGAs

- **Download incorrect bit files from VME**
  - **bit files generated for same device type**
    - **CMM system FPGA Vs crate FPGA**
    - **This is more likely than mixing up bit files between CPM and CMM**
  - **bit files generated for different package types can be loaded**
    - **CP (XCV1000E-6BG560) Vs CMM (XCV1000E-6FG860)**
  - **bit files generated for different devices can be loaded**
    - **XCV600 Vs XCV1000**

Damage to FPGAs

- How can we prevent this?
  - **Software can check bit file header before downloading**
    - **Bit files has ASCII characters indicating:**
      - **File name (make it clear and unique)**
      - **Device and package (could be the same: CMM)**
      - **Date**
  - **Monitor the temperature of the device**
    - **Use FPGA internal temperature diode (monitor via CAN bus)**
    - **Other hardware solutions (for general purpose modules)**
      - **Interface between temperature diode and power supply**
      - **Interface between diode and INIT to reset configuration**