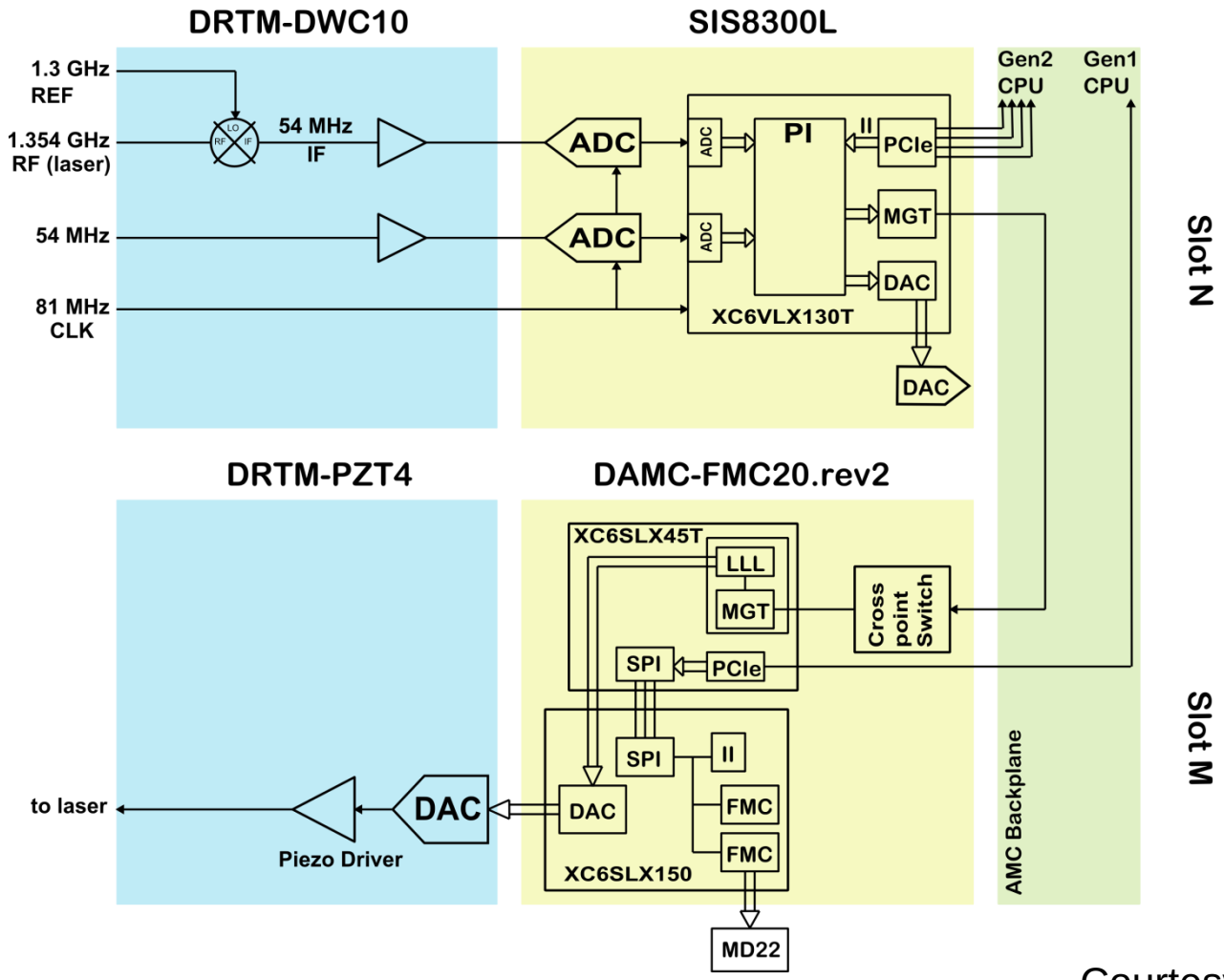
Collection of Ideas concerning Laser Lock Server / FW

(Some are already implemented, but many things still missing)

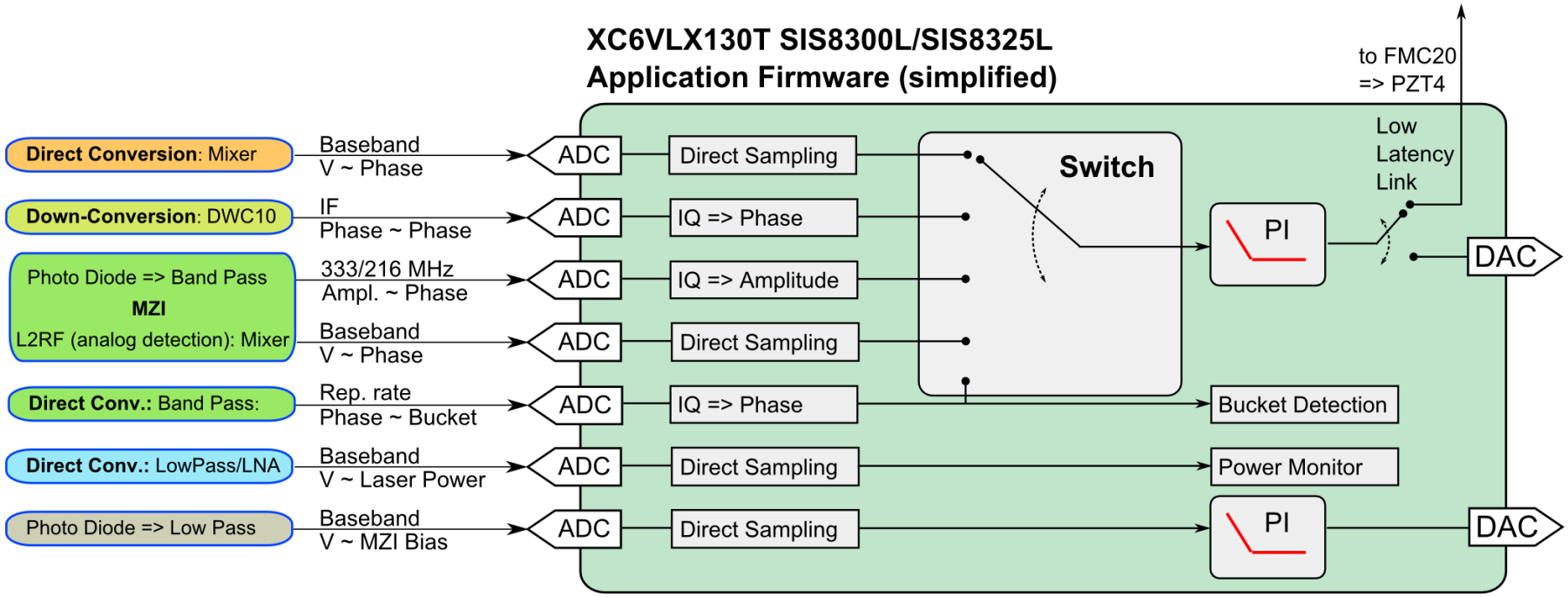
Blockdiagram of Signal Processing - Existing FW



- PI: PI controller
- PCIe: Peripheral Component Interconnect express
- MGT: Multi-gigabit transceiver
- LLL: Low Latency Link
- SPI: Serial Peripheral Interface

Courtesy of C. Gerth

Future Application Firmware Signal Needs

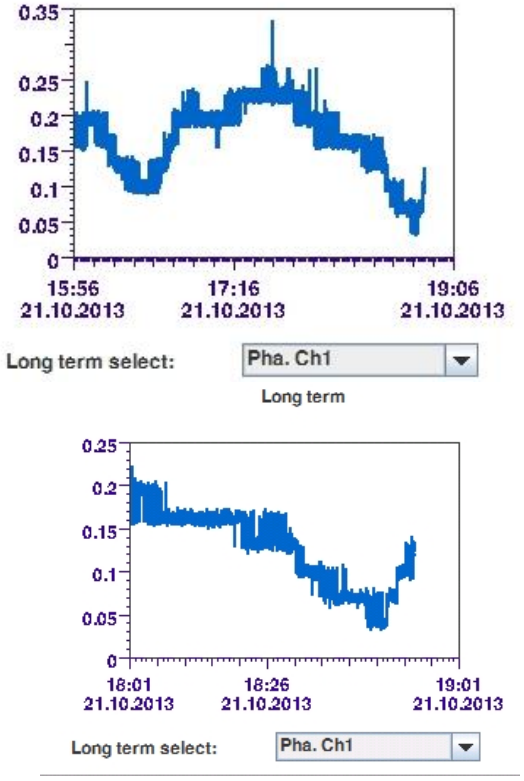


To-do:

- Take newest base FW from Łukasz and combine it with Paweł's Simulink Interface
- Copy Uros' SysGen Model to other channels and provide switching between different inputs
- Debugging of application FW
  - In-loop drifts
  - Error clipping
  - ...

FW needs

- SIS8300, SIS8300L, SIS8325L
  - MSK-compiant board FW
  - Support FW for connected modules (DWC w/o and with attenuators)
  - Component Support in Simulink Library
  - Copy and further development of control FW, Debugging!!
- FMC20 common for Laser & Link (almost)
  - MSK-compiant board FW
  - Support FW for connected modules
    - PZT4
    - MD22
    - LASIO



Server needs

- Handling of all FW signals
- Upgrade of current server:
  - Debugging List: email communication → Redmine

Coarse tuning

- Support of all possible methods:
  - Motor: Beckhoff / MD22 (also FW)
  - TTL: Beckhoff / LASIO (also FW)
- User definable direction & target range
- Check direction after each step

Different Inputs & Bucket Detection

- Bucket detection implementation
- Switching between different controller inputs / phase detection methods
- Bucket → Fine Lock → Balanced det.
- Automatic calibration procedures (Kphi, OXC Slope)
- Automatic Locking & Error handling (supervision)

Timing Scan

- Nowadays done with DAC8 Server & VM
- With DWC scheme: just phase SP
  - Same scan functionality needed
  - Step-width: single step or steps per second
  - Virtual phase as reference

Special Transfer Functions

- Low pass
- Notch
  - Center Frequency
  - Filter order
  - Bandwidth
- Parameters for more ‘fancy‘ algorithms → Michael Heuer