



Em# PROJECT. IMPROVEMENT OF LOW CURRENT MEASUREMENTS AT ALBA



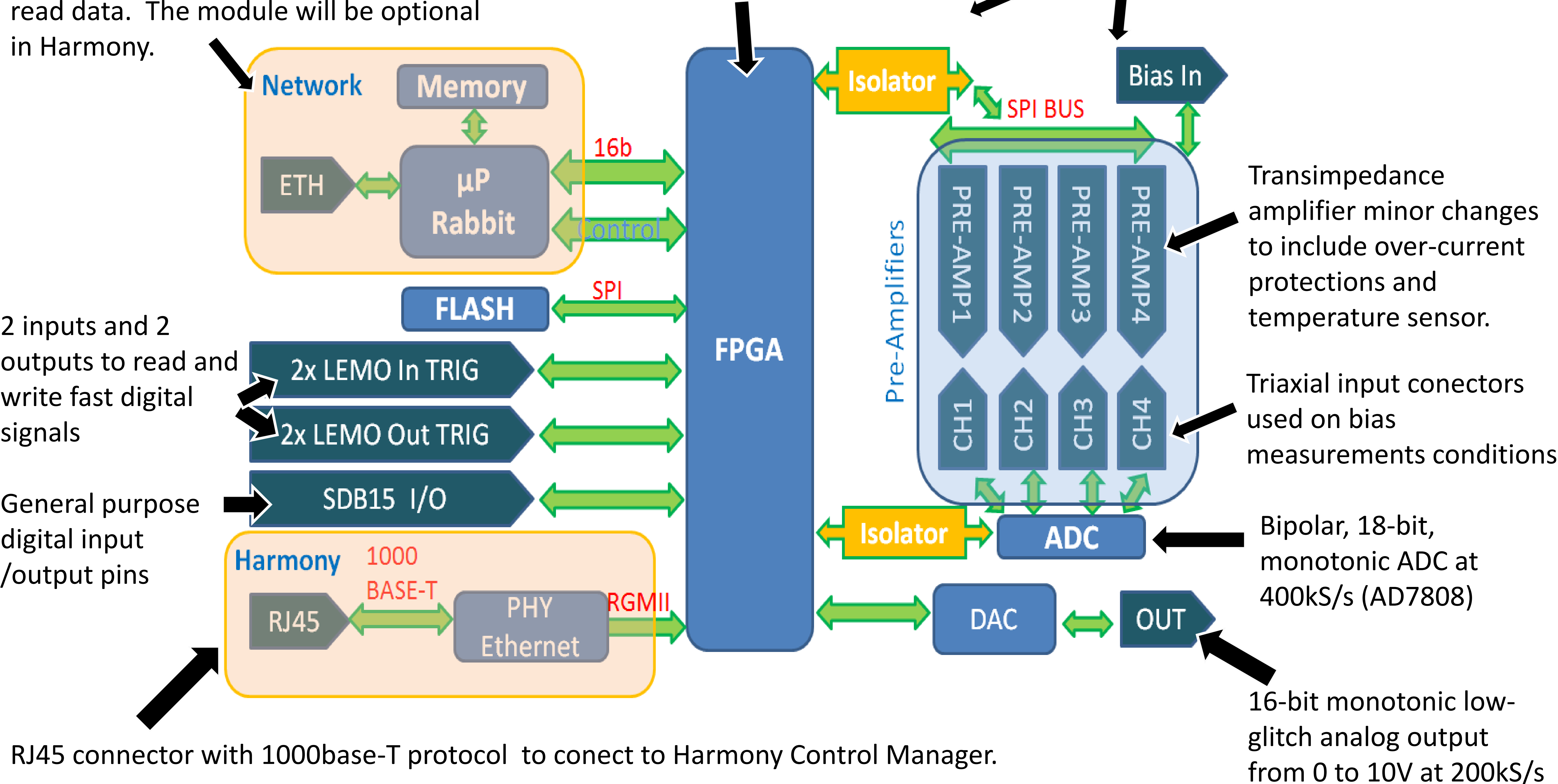
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Alba is a new third generation 3GeV synchrotron light with 7 commissioned beamlines and space for 24 more. Two years ago an in-house 4-channels electrometer was developed with amazing results and a very good acceptance from beamline scientists. Now we are designing the evolution ALBA-Em. This new electrometer is born to be used as detector in some beamlines.

A Rabbit Semiconductors RCM6700 module will be included for diagnostic reasons, remote firmware update and read data. The module will be optional in Harmony.

Spartan 6 FPGA that will manage the Alba-Em# and it will be the device Manager in Harmony

The Alba-Em# accepts 500Vdc of bias that have to be supplied from external source



Feature	Target description
Current range	7 range available from 1mA to 100pA, or 5 ranges from 10nA to 1pA
Bias	Isolation Voltage of current amplifiers 500V
ADC	4 x monotonic 18bits bipolar SAR 400kS/s
Analog out	1x Monotonic low-glitch 16bits 200kS/s
Fast digital inputs	2 channels, for triggers inputs or to read frequency up to 100MHz
Fast digital outputs	2 channels, for triggers outputs or to generate frequencies up to 100MHz
GPIO	DE15M port for general purpose use
Control	Spartan 6 FPGA
Time Resolution	Timestamp in all the measurements with 1ns resolution
Latency	Maximum delay of 30µs
External interface	RCM6700 in standalone Marvell 88E1111 in Harmony System

- Next Steps**
- Phase 1. Improve current Amplifier. Sent to manufacturer
 - Phase 2. Control and ADC boards. PCB Design on-going
 - Phase 3. First Prototype of standalone Alba-Em#. January 2014
 - Phase 4. Develop of Harmony. 2014
- The project end is foreseen for mid-2015

Harmony

- Instrumentation platform protocol based on simple reflective memory sharing.
- Follows star topology.
- Time-deterministic signal communication with characterized latency.
- Data exchange bandwidth tunable and accessible from master.
- Possibility to add commercial hardware.

