

Software updates for Libera eBPMs

Peter Leban, April 10, 2014

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Motivation for updates



To resolve a specific issue with Digital Signal Conditioning functionality in original Libera software.

Issue reports from ESRF, ALBA, PETRA-III and ASTRID.

Great advisory and support from DIAMOND.

ALBA kindly offered to be a test field.

a BIG **“Thank You”** for all parties involved!

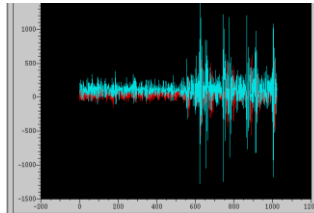
Updates for platform A instruments

Updated DSC daemon:

- Input data quality estimation
- Use a single set of DSC coefficients (no Level-dependent table)

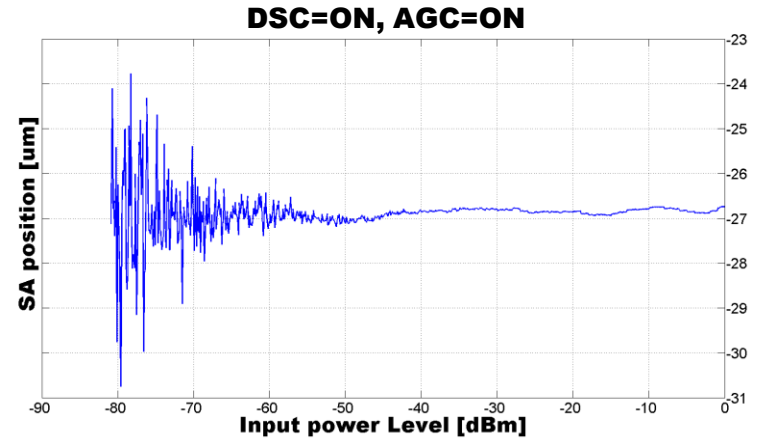
Glitches in ADC data

- Bug from day 0



Updates in Generic Server (2.09 only)

- Merges from version 1.8x – TINE specific



Updates for platform A instruments

New software update available in several versions

- 2.09 standard software release
- 2.09 with Libera Grouping 128 functionality
- 2.22 Feature pack software release
- 2.22 Feature pack ESRF specific software release

... and for two instruments

- Libera Electron
- Libera Brilliance

Update is not required for users that use Diamond's EPICS driver.

Updates for platform B instrument

Updated DSC daemon

Single-Pass functionality

Statistics calculation on SA and TBT data paths

ADC saturation detection at turn-by-turn rate (contribution from Diamond)

Fast Interlock detection (at turn-by-turn rate) – KEKB specific

Optic event support in the EvRx module

Support for SER module (RS-485 outputs)

Customer-specific FOFB applications

Minor platform improvements and updates



Interlock updates

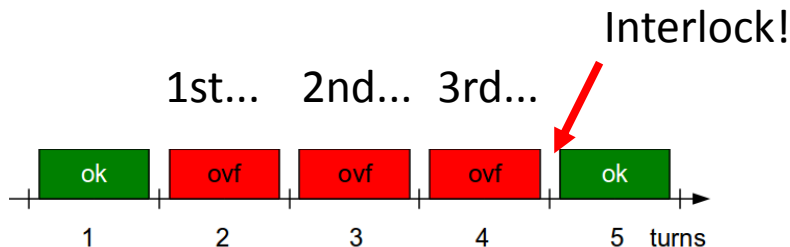
ADC saturation detection (example)

- Allowed duration: 3 turns
- Allowed ADC peak: 80% full scale

Checks ADC peak at ADC rate

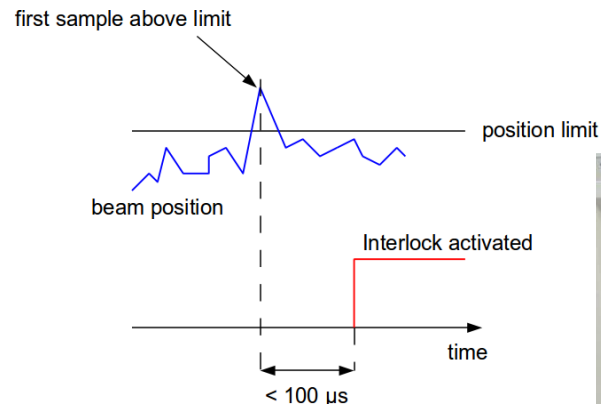
Counts “saturated” turns (N)

If $N > \text{allowed duration} = \text{Interlock}$



Fast Interlock detection (KEK-B only):

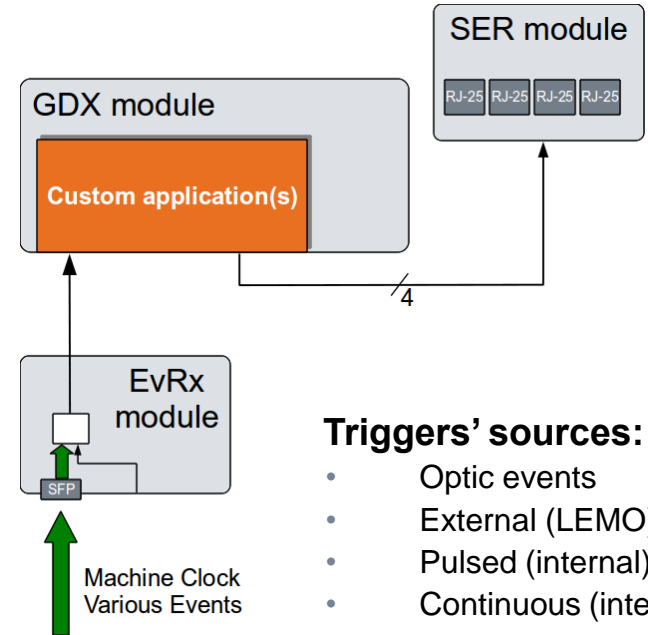
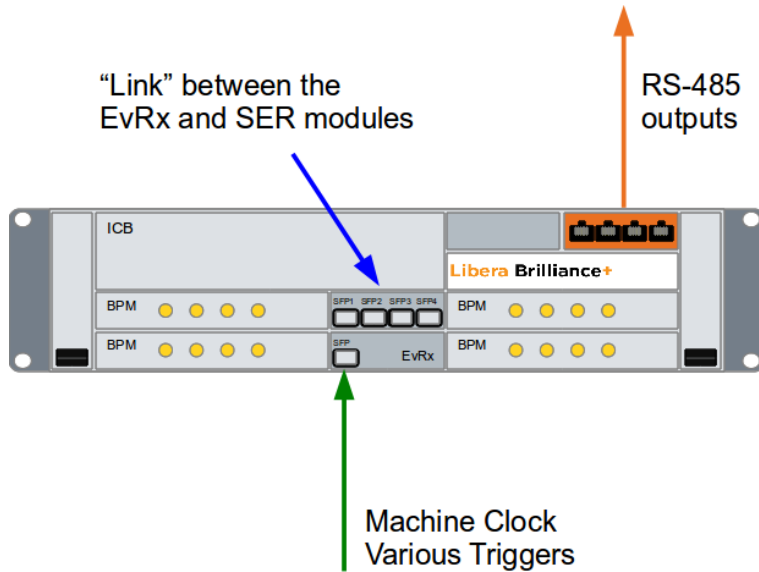
- Detection on position data (X, Y)
- Source data: turn-by-turn (not FA!)
- Data rate: 99 kSamples/s



Measured latency
about **20 – 30 μs**
(reported by KEK-B).



EvRx, GDX and SER modules



Benefits

Updated DSC is now stable and robust.

New functionalities (single-pass, statistics) are available as plugins

Customer-developed/proposed solutions are available to all users

Further reduction of timing cables → a single optic fibre is enough

4x RS-485 outputs → a newly introduced hardware module

It's free of charge!

We're adding customer-specific FOFB applications (to software and GDx's FPGA)

Feedback from users

ALBA: “DSC behavior is more stable, we have not suffer from faulty interlocks and position reading is also more stable.”

KEK-B: “I tested the fast interlock function of Libera Brilliance+. I could see that the latency is less than 100 μ s. This result is very good.”

DIAMOND: “...as of Friday DCC has been running on GDX module.”

Roadmap

Support for **hardware PLL**

Provide **turn-by-turn data to GDX module**

Set **individual scaling coefficients** for ABCD channels

Self-contained **FOFB calculation system** (no BPM modules)

OS upgrade to ? (will be discussed later, more options on the table)

+ suggestions for additions to EvRx module (to support event generation)

More suggestions
WELCOME!