Status of the ODR and System Integration

31 March 2009

Matt Warren

Valeria Bartsch, Veronique Boisvert, Maurice Goodrick, Barry Green, Bart Hommels, Marc Kelly, Andrzej Misiejuk, Martin Postranecky, Matthew Wing, Tao Wu

Firmware Status (no change)

- Receive data on 4x fibre (RX),
- Write to disk FAST (>150MB)
- Send data up fibre (TX)
- Controlled from Linux driver
- DOOCs Interface

Future plans:

- Decode event header from LDA
  - Provides on-line info
  - Can deal with control messages from LDA
  - Allows host to write to disk without processing

ODR V2 Saga *(starring Barry at RHUL)*

- PLDA (the manufacturer) 'upgraded' to a new board
  - We call this "Version 2"
  - Main change: clock increased from 125 to 250MHz (Xilinx gig-links prefer this)
  - Jumper allows use of old 125MHz clock, our firmware works/ed in this mode …
- Then our code stopped working on a v2s…
  - Card not recognised on PCIe bus
  - To rule-out hardware failure, we tried a second card. Failed too.
- After LOTS of trials and testing, we contacted PLDA
  - We tried their reference design – it worked (PLDA off the hook)!
  - We removed much of our design – it DIDN'T work.
  - We scratched our heads …
- Contacted PLDA again - They tried our firmware – it worked!
  - Could it be the PC? - We've tried various motherboards, presume not.
- Phone meeting with PLDA
- We sent our card this to them - IT FAILS! **HOORAY!**
  - They're about to get new stock (this week!) – will retest our code…

Introducing LODDAR

Due to LDA delays, we decided to kick-start the system test.

LDA → LODDAR ← ODR

- Use ODR hardware as an LDA
  - Wrap LDA code for Virtex4
  - Use onboard SFP for Ethernet link
  - ODR Virtex4 MAC and replaces LDA version
  - No PCIe etc
- Add (existing) LDA HDMI board via debug pins on ODR
- Connect to a real ODR using the proper fibre interface

DAQ System Test
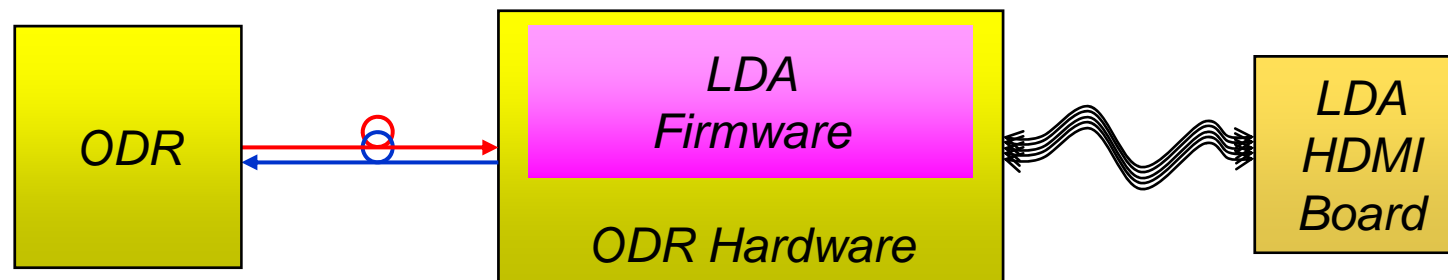
- Setup at UCL
  - Aim to build complete DIF to DAQ PC chain
- So far we have ODR, LODDAR only.
  - DIF hardware and firmware is available
  - LDA is has been difficult (see Marc's talk)
- LODDAR in separate PC (power only)
  - Easier power-cycling etc of LODDAR
- For initial testing. ODR packets sent to PC running *wireshark*
  - sanity check – Ethernet has advantages!
- Then plug outgoing fibre ONLY into LODDAR
  - Monitor replies with *wireshark* – very useful.
- Then complete the link

- **Good News** – the LDA responds as expected
  - Packet sent containing multi-register write to configure test data
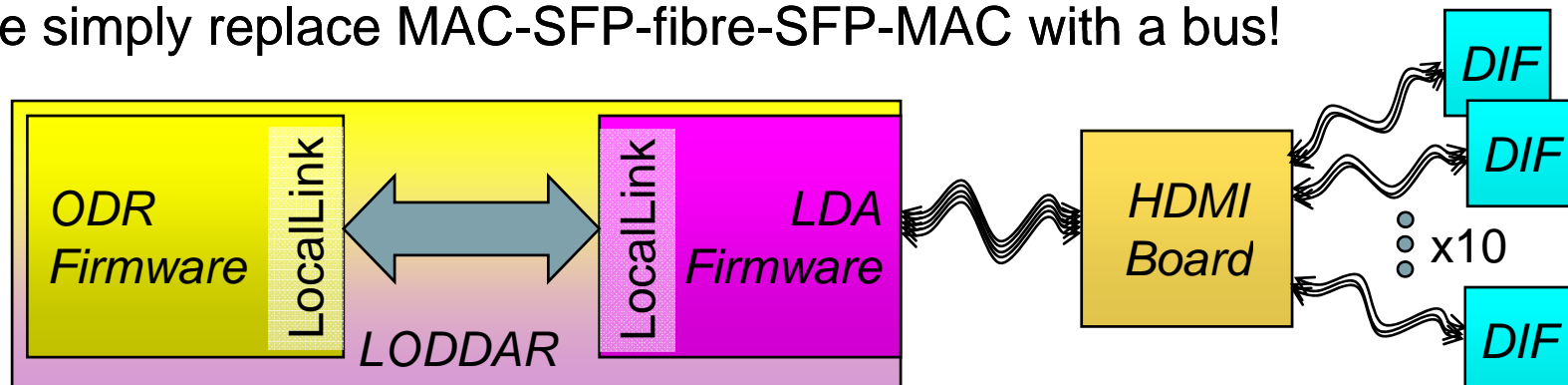 - 16 packet received by DAQ software
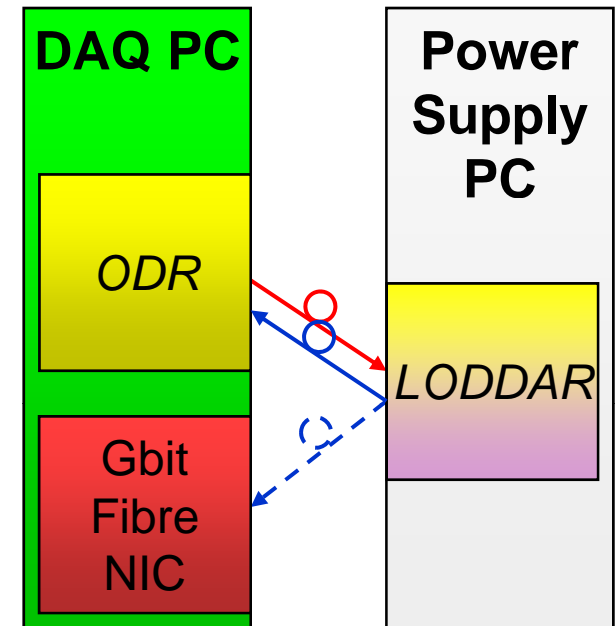
- As the LDA develops
  - Incorporate new firmware into LODDAR
  - Use as testbed for DAQ PC software (*caldata*)
- Then move over to using the LDA

IF we have production delays (+Ethernet +HDMI board), we can go to "*LODDAR2*":

- Fully combine LDA and ODR functions
  - Both firmware functions inside the ODR
  - External IO (e.g. CCC) via debug pins
- Both firmware designs use Xilinx LocalLink interfaces
  - We simply replace MAC-SFP-fibre-SFP-MAC with a bus!

ODR Firmware — LocalLink ⟷ LocalLink — *LDA Firmware* — *LODDAR* — *HDMI Board* — x10 — *DIF DIF DIF*

The End