Control and Test Software for IRAM WideX Correlator

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Overview

1. Presentation
2. Technical choices
3. Software
4. Running modes
5. Conclusion
What is a correlator?

The correlator filters the background noise and extracts the weak cosmic signal.
The WideX correlator

WideX correlator on the observatory site.
Main numbers
Main numbers

1792 correlator chips
Main numbers

1,792 correlator chips

1,792 Mbit/s data output
Main numbers

1,792 correlator chips

1,792 Mbit/s data output

Real-time software at 32 Hz
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CERN Detector Data Link (DDL)

Source Interface Unit

ALICE

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Control Software for WideX correlator

ICALEPCS 2011
CERN Detector Data Link (DDL)

Source Interface Unit

Destination Interface Unit

ALICE
CERN Detector Data Link (DDL)

- Fast (1.5 Gbit/s per link)

Source Interface Unit

Destination Interface Unit
CERN Detector Data Link (DDL)

- Fast (1.5 Gbit/s per link)
- Easy to use

Source Interface Unit

Destination Interface Unit
CERN Detector Data Link (DDL)

- Fast (1.5 Gbit/s per link)
- Easy to use
- Low cost

Source Interface Unit

Destination Interface Unit

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Time diagram

32 Hz

Correlator

Computer

32 Hz
Time diagram

32 Hz

Data Readout

EOBTR

Correlator

32 Hz

Data Readout

EOBTR

Computer

RDYRX

RDYRX
Time diagram

32 Hz

Data Readout

Sending window

Write cmd

EOBTR

Correlator

32 Hz

Data Readout

Computer

RDYRX
Time diagram

32 Hz

Data Readout
Sending window

 eof

idle or data processing
Write cmd

idle or data processing

Correlator

Computer
Software architecture

- CONTROL
  - Optical Link
  - DRIVE

- DRIVE
  - idle
  - Write cmd
  - idle
  - idle

32 Hz
Software architecture

![Diagram of software architecture](image)
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Chip debugging

![Widex Debug Chip](image)

**Static Test p=0**

**Error Hold OFF**

**Mode**

**Noise Tolerance**

**Baseline**

**Boards**

**PC clock:** 13.48.42.262
Observing mode

![Graph showing input and output real and phase degree](image-url)
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Conclusion

- Innovative pair: CERN DDL – RTAI
- Real-time driving and processing.
- Free open-source software only
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To the edge of the universe
http://www.iram.fr