

SDD Raw Data Decoding

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Summary

- SDD Raw Data Format
- Decoding Raw Data
- Parallel events
- Data File Analysis

SDD Raw Data Format

- Header Event: 9 words start and end with 0xFFFF FFFF in which there is the ddl header
- FIFO Header 0x3000 0010 - 4
- Carlos Header 0x3000 0000 - B
- Event Header of the Carlos triplets of words starting with =0x2
- Data
- Carlos Footer Words 3FFF FFFF
- FIFO Footer Words (MacroFooters) 3F1F 1F1F
- Jitter Word: the last word of the event

For more information:

http://www.bo.infn.it/~falchier/carlosrx_v4_rel1.2_datasheet.pdf page 23

SDD Raw Data Structure

Size:287452 (header:68) Version:0x00030009 Type:PhysicsEvent
RunNb:2632 Period:2587 Orbit:3145728 BunchCrossing:0 Idcld:9 gdcld:VOID
time:Wed Sep 19 19:30:49 2007

Attributes:Orbit/BC (00000000.00000000.00000020)
triggerPattern:80000000-00000002 detectorPattern:00000000[invalid]

```
0) 00046298 00000011 00000108 00000000 | .b.. .... |
16) 00000000 00000000 00000004 ffffffff | ..... |
32) 02000000 00000000 ff000000 0140002b | ..... +.@. |
48) 00000000 00000000 00000000 ffffffff | ..... |
64) 30000011 30000004 23658d96 23658d96 | ...0 ...0 ..e# ..e# |
80) 23658d96 aa6ae808 eaeca808 acaba4a4 | ..e# ..j. .... |
96) d3d35b96 a2a6969e dd535b5d 8a9acb0a | ..[...] [S. .... |
112) c2e4c525 abeababab dacacbab aaacb1ac | %..... |
```

Header

Header Carlos Event

Data

Fifo Word

Carlos Word

```
574384) a3a3a5a5 a2a2aa9e 8a7a4a4a 952168e9 | .... JJz. .h!. |
574400) 81207b91 3fffffff 3fffffff 3fffffff | ? ...? ...? |
574416) 3f1f1f1f 3f1f1f1f 3f1f1f1f ff00000e | ...? ...? ...? |
```

Carlos Footer Words

Fifo Footer words

Jitter Word

AliTISRawStreamSDD::Next() Decoding scheme

- Check of FIFO Header Words
- Check of Carlos Event Header Words
- Check of Jitter Words
- Check of Footer Words
- Data decoding

Events

Single DDL event contains data of a single DDL. The decoding process ends with the last word: jitter word. The decoding ends because no more words are left

Multiple DDL event contains data of more DDLs together. DDL data are written in each event one after the other. That means that after the jitter word of a DDL may be the data of another DDL

Parallel Events

- Control of the maximum number of MacroFooter(=3F1F 1F1F) in order to consider if a DDL with all the channels is connected. Words after the 12th MacroFooter are considered out of range until the jitter word is found.
- Control of the Jitter Word: When a jitter word is found, it means that the data coming from this DDL are finished and all the basic counters are reset.

Data File Analysis

Data saved as DATE file: the events can be read starting from the 3rd event (Carlos firmware bug in first event writing)

Data saved by EventDump: The event can be read starting from the first event

Jitter Word

- In order to decode data, the jitter word has to be changed because the 0xFF00**** can be confused with a data word.
- Carlosrx Team will change the beginning of the word probably in 0x7F00****

Summary and Outlook

- AlITSRawStreamSDD decode correctly single DDL and multiDDL events

TO do:

- Jitter word needs to be changed in order to recognise it
 - In order to decode data, the jitter word has to be changed because the 0xFF00**** can be confused with a data word.
 - Carlosrx Team will change the beginning of the word probably in 0x7F00****
- Try to read events written in an Event stored in GDC

SDD DAQ CHAIN(some numbers)

- 2 LDCs
 - For each LDC 12 DLLs connected
 - 1DDL interfaced with a CARLOS_rx
 - 1CARLOS_rx can read at maximum 12 CARLOSv
 - Each CARLOSv connected with 1 SDD module=> 2 half modules
- 2 LDC => 24 DDLs =>24 CARLOS_rx=>260 of 288 connections used for reading the modules=>520 half modules connected

AliITSRawStreamSDD

- Provide the access to SDD raw data format
- AliITSRawStreamSDD::Next() : read the next raw data and return kFALSE if no data are left