

RawData unpacker and packer

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1, Unpacker

1-1, Example : how to get information of RawCOPPER header

You can get event # info from RawCOPPER object like this;

```
StoreArray<RawCOPPER> raw_cprarray; // When StoreArray is used
for (int i = 0; i < raw_cprarray.getEntries(); i++) { //When StoreArray is used
    for ( int j = 0; j < raw_cprarray[ i ]->GetNumEntries(); j++) {
        //      Get Event number
        unsigned int event_no = raw_cprarray[ i ]->GetEveNo( j );

        //      Get RawCOPPER data block
        int* buf = raw_cprarray[ i ]->GetBuffer( j );
        //      See contents of a data block (from RawCOPPER header to RawCOPPER trailer)
        for( int k = 0; k < raw_cprarray[ i ]->GetBlockNwords( j ); k++ ) printf("%.8x¥n", buf[ k ] );

        //      Get Detector Buffer (raw data from detector electronics)
        for( int finesse_num =0; finesse_num < 4; finesse_num++) {
            int* buf_slot = raw_cprarray[ i ]->GetDetectorBuffer( j, finesse_num );
            //      See contents of raw data from detector
            for( int k = 0; k < raw_cprarray[ i ]->GetDetectorNwords( j, finesse_num ); k++ ){
                printf("%.8x¥n", buf_slot[ k ] );
            }
        }
    }
}
```

1-2, Test program to read RawCOPPER(RawCDC) data

1, Get dummy data file (data from two CDC FEE boards connected to FINESSE A and C.)
login.cc.kek.jp : ~yamadas/rawdata/[root_output_RawCDC_rev7133.root](#)

2, See contents of the data

```
% cd ${BELLE2_LOCAL_DIR}/daq; svn update
```

```
% cd ${BELLE2_LOCAL_DIR}/daq/rawdata/examples/
```

```
% basf2 ReadStoreTemplate.py -i ./root\_output\_RawCDC\_rev7133.root | less
```

[INFO] Steering file: ReadStoreTemplate.py

```
>>> basf2 Python environment set
```

```
>>> Framework object created: fw
```



```
==== DataBlock(RawCDC) : Block # 0 : Event # 0 : node ID 0x00000000 : block size 224 bytes
```

```
== Detector Buffer(FINESSE A)
```

```
0x0094c13a 0x91000001
```

```
== Detector Buffer(FINESSE C)
```

```
0x0094c13a 0x91000001
```

```
==== DataBlock(RawCDC) : Block # 1 : Event # 1 : node ID 0x00000000 : block size 224 bytes
```

```
== Detector Buffer(FINESSE A)
```

```
0x0094c23f 0xf1000001
```

```
== Detector Buffer(FINESSE C)
```

```
0x0094c23f 0xf1000001
```

```
==== DataBlock(RawCDC) : Block # 2 : Event # 2 : node ID 0x00000000 : block size 224 bytes
```

```
== Detector Buffer(FINESSE A)
```

```
0x0094c30d 0x69000001
```

```
== Detector Buffer(FINESSE C)
```

```
0x0094c30d 0x69000001
```

```
....
```

In this data,

Detector buffer contains only 2words(=8bytes)
per/FINESSE/event.

Note that block # is a number used by DAQ software
for handling data and not related with **Event #**.

2, Packer

2-1, Function to store data in RawCOPPER object

```
void RawCOPPER::PackDetectorBuf( int* detector_buf_1st, int nwords_1st, int* detector_buf_2nd, int  
nwords_2nd, int* detector_buf_3rd, int nwords_3rd, int* detector_buf_4th, int nwords_4th,  
RawCOPPERPackerInfo rawcprpacker_info ){} 
```

Input variables :

int* detector_buf_*** : pointer to the detector buffer that you want to store as ***th FINESSE data.

int nwords_*** : length of the detector_buf_*** (unit -> word = 4bytes)

RawCOPPERPackerInfo rawcprpacker_info : Information to fill RawHeader

```
struct RawCOPPERPackerInfo {  
    unsigned int exp_num; // 10bit  
    unsigned int run_subrun_num; // 22bit  
    unsigned int eve_num; // 32bit  
    unsigned int node_id; // 32bit  
    unsigned int tt_ctime; // 27bit clock ticks at trigger timing distributed by FTSW.  
    For details, see Nakao-san's belle2link user guide  
    unsigned int tt_utime; // 32bit unix time at trigger timing distributed by FTSW.  
    For details, see Nakao-san's belle2link user guide  
    unsigned int b2l_ctime; // 27bit clock ticks at trigger timing measured by HSLB  
    on COPPER. For details, see Nakao-san's belle2link user guide  
    unsigned int hslb_crc16_error_bit; // 4bit errorflag for CRC errors in data  
    transfer via b2link. ( bit0,1,2,3 -> finesse slot a,b,c,d)  
    unsigned int truncation_mask; // Not defined yet  
    unsigned int type_of_data; // Not defined yet  
};
```

(#include <rawdata/include/RawCOPPERPackerInfo.h>)

2-2, test program to store data in RawCOPPER object

- Module to fill dummy data in RawCOPPER
 - rawdata/modules/src/DummyDataPacker.cc
- Script to run the above module
 - \$ rawdata/scripts/DummyDataPacker.py

end

Revision history

- July 15, 2014 (rev.11616) : ver.1