

streamout

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# 1 Hierarchical Index

## 1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

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## 2 Class Index

### 2.1 Class List

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### 3.1 File List

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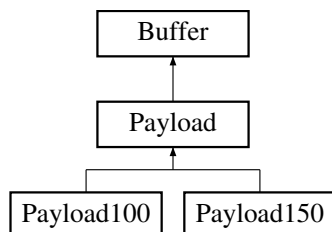
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## 4 Class Documentation

### 4.1 Buffer Class Reference

```
#include <libs/core/include/Buffer.h>
```

Inheritance diagram for Buffer:



## Public Member Functions

- [Buffer](#) ()
- virtual [~Buffer](#) ()
- [Buffer](#) (const [bit8\\_t](#) b[], const [std::size\\_t](#) &i)
- [Buffer](#) (const char b[], const [std::size\\_t](#) &i)
- template<typename T >  
  [Buffer](#) (const [std::vector](#)< T > &rawdata)
- template<typename T, [std::size\\_t](#) N>  
  [Buffer](#) (const [std::array](#)< T, N > &rawdata)
- [std::size\\_t](#) [size](#) () const
- [std::size\\_t](#) [capacity](#) () const
- bool [empty](#) ()
- void [set](#) (unsigned char \*b)
- void [set](#) (const [Buffer](#) &buffer)
- [bit8\\_t](#) \* [begin](#) () const
- [bit8\\_t](#) \* [end](#) () const
- [bit8\\_t](#) & [operator\[\]](#) (const [std::size\\_t](#) &pos)
- [bit8\\_t](#) & [operator\[\]](#) (const [std::size\\_t](#) &pos) const
- void [setSize](#) (const [std::size\\_t](#) &size)

### 4.1.1 Detailed Description

Definition at line 14 of file [Buffer.h](#).

### 4.1.2 Constructor & Destructor Documentation

#### 4.1.2.1 [Buffer](#)() [1/5] `Buffer::Buffer ( ) [inline]`

Definition at line 17 of file [Buffer.h](#).

```
00017 : m_Buffer(nullptr), m_Size(0), m_Capacity(0) {}
```

#### 4.1.2.2 [~Buffer](#)() virtual `Buffer::~Buffer ( ) [inline], [virtual]`

Definition at line 18 of file [Buffer.h](#).

```
00018 {}
```

#### 4.1.2.3 [Buffer](#)() [2/5] `Buffer::Buffer ( const bit8\_t b[], const std::size\_t & i ) [inline]`

Definition at line 19 of file [Buffer.h](#).

```
00019 : m_Buffer(const_cast<bit8\_t*>(&b[0])), m_Size(i), m_Capacity(i) {}
```

**4.1.2.4 Buffer()** [3/5] Buffer::Buffer (   
 const char b[],   
 const std::size\_t & i ) [inline]

Definition at line 20 of file [Buffer.h](#).

```
00020 : m_Buffer(const_cast<bit8_t*>(reinterpret_cast<const bit8_t*>(&b[0])), m_Size(i * sizeof(char)),   
 m_Capacity(i * sizeof(char)) {}
```

**4.1.2.5 Buffer()** [4/5] template<typename T >   
 Buffer::Buffer (   
 const std::vector< T > & rawdata ) [inline]

Definition at line 21 of file [Buffer.h](#).

```
00021 : m_Buffer(const_cast<bit8_t*>(reinterpret_cast<const bit8_t*>(rawdata.data()))),   
 m_Size(rawdata.size() * sizeof(T)), m_Capacity(rawdata.capacity() * sizeof(T)) {}
```

**4.1.2.6 Buffer()** [5/5] template<typename T , std::size\_t N>   
 Buffer::Buffer (   
 const std::array< T, N > & rawdata ) [inline]

Definition at line 22 of file [Buffer.h](#).

```
00022 : m_Buffer(const_cast<bit8_t*>(reinterpret_cast<const bit8_t*>(rawdata.data()))),   
 m_Size(rawdata.size() * sizeof(T)), m_Capacity(rawdata.size() * sizeof(T)) {}
```

## 4.1.3 Member Function Documentation

**4.1.3.1 begin()** bit8\_t \* Buffer::begin ( ) const [inline]

Definition at line 35 of file [Buffer.h](#).

```
00035 { return m_Buffer; }
```

**4.1.3.2 capacity()** std::size\_t Buffer::capacity ( ) const [inline]

Definition at line 25 of file [Buffer.h](#).

```
00025 { return m_Capacity; }
```

**4.1.3.3 empty()** bool Buffer::empty ( ) [inline]

Definition at line 27 of file [Buffer.h](#).

```
00027 { return m_Size == 0; }
```

**4.1.3.4 end()** `bit8_t * Buffer::end ( ) const [inline]`

Definition at line 36 of file [Buffer.h](#).

```
00036 { return m_Buffer + m_Size; }
```

**4.1.3.5 operator[]()** [1/2] `bit8_t & Buffer::operator[] ( const std::size_t & pos ) [inline]`

Definition at line 37 of file [Buffer.h](#).

```
00037 { return m_Buffer[pos]; }
```

**4.1.3.6 operator[]()** [2/2] `bit8_t & Buffer::operator[] ( const std::size_t & pos ) const [inline]`

Definition at line 38 of file [Buffer.h](#).

```
00038 { return m_Buffer[pos]; }
```

**4.1.3.7 set()** [1/2] `void Buffer::set ( const Buffer & buffer ) [inline]`

Definition at line 29 of file [Buffer.h](#).

```
00030 {  
00031     m_Buffer = buffer.begin();  
00032     m_Size = buffer.size();  
00033     m_Capacity = buffer.capacity();  
00034 }
```

**4.1.3.8 set()** [2/2] `void Buffer::set ( unsigned char * b ) [inline]`

Definition at line 28 of file [Buffer.h](#).

```
00028 { m_Buffer = b; }
```

**4.1.3.9 setSize()** `void Buffer::setSize ( const std::size_t & size ) [inline]`

Definition at line 40 of file [Buffer.h](#).

```
00040 { m_Size = size; }
```

**4.1.3.10 size()** `std::size_t Buffer::size ( ) const [inline]`

Definition at line 24 of file [Buffer.h](#).

```
00024 { return m_Size; }
```

The documentation for this class was generated from the following file:

- [libs/core/include/Buffer.h](#)

## 4.2 BufferLooper< SOURCE, DESTINATION > Class Template Reference

```
#include <libs/core/include/BufferLooper.h>
```

### Public Member Functions

- [BufferLooper](#) (SOURCE &source, DESTINATION &dest, bool debug=false)
- void [addSink](#) (const spdlog::sink\_ptr &sink, const spdlog::level::level\_enum &level=spdlog::get\_level())
- void [loop](#) (const std::uint32\_t &m\_NbrEventsToProcess=0)
- void [printAllCounters](#) ()
- std::shared\_ptr< spdlog::logger > [log](#) ()
- void [setDetectorIDs](#) (const std::vector< [DetectorID](#) > &detectorIDs)

### 4.2.1 Detailed Description

```
template<typename SOURCE, typename DESTINATION>
class BufferLooper< SOURCE, DESTINATION >
```

Definition at line 28 of file [BufferLooper.h](#).

### 4.2.2 Constructor & Destructor Documentation

**4.2.2.1 BufferLooper()** `template<typename SOURCE , typename DESTINATION > BufferLooper< SOURCE, DESTINATION >::BufferLooper ( SOURCE & source, DESTINATION & dest, bool debug = false ) [inline]`

Definition at line 31 of file [BufferLooper.h](#).

```
00031                                     : m_Source(source),
    m_Destination(dest), m_Debug(debug)
00032 {
00033     m_Logger = spdlog::create<spdlog::sinks::null_sink_mt>("streamout");
00034     if(!spdlog::get("streamout")) { spdlog::register_logger(m_Logger); }
00035     m_Source.setLogger(m_Logger);
00036     m_Destination.setLogger(m_Logger);
00037 }
```

## 4.2.3 Member Function Documentation

## 4.2.3.1 addSink() template&lt;typename SOURCE , typename DESTINATION &gt;

```
void BufferLooper< SOURCE, DESTINATION >::addSink (
    const spdlog::sink_ptr & sink,
    const spdlog::level::level_enum & level = spdlog::get_level() ) [inline]
```

Definition at line 39 of file [BufferLooper.h](#).

```
00040 {
00041     sink->set_level(level);
00042     m_Sinks.push_back(sink);
00043     m_Logger = std::make_shared<spdlog::logger>("streamout", begin(m_Sinks), end(m_Sinks));
00044     m_Source.setLogger(m_Logger);
00045     m_Destination.setLogger(m_Logger);
00046 }
```

## 4.2.3.2 log() template&lt;typename SOURCE , typename DESTINATION &gt;

```
std::shared_ptr< spdlog::logger > BufferLooper< SOURCE, DESTINATION >::log ( ) [inline]
```

Definition at line 239 of file [BufferLooper.h](#).

```
00239 { return m_Logger; }
```

## 4.2.3.3 loop() template&lt;typename SOURCE , typename DESTINATION &gt;

```
void BufferLooper< SOURCE, DESTINATION >::loop (
    const std::uint32_t & m_NbrEventsToProcess = 0 ) [inline]
```

Definition at line 48 of file [BufferLooper.h](#).

```
00049 {
00050     // clang-format off
00051     fmt::print(fmt::color::medium_orchid | fmt::emphasis::bold,
00052         "\n"
00053         " SSSSSSSSSSSSSSS      tttt
00054         tttt\n"
00055         "SS::::::::::::::::::S ttt:::t
00056         ttt:::t\n"
00057         "S::::SSSSSS:::::S t:::::t
00058         t:::::t\n"
00059         "S:::::S      SSSSSSS t:::::t
00060         t:::::t\n"
00061         "S:::::S      tttttt:::::tttttt rrrrr rrrrrrrrrr eeeeeeeeeeee aaaaaaaaaaaaaa
00062         mmmmmmm mmmmmmm oooooooooo uuuuuu uuuuuutttttt:::::tttttt\n"
00063         "S:::::S      t:::::t r:::::rrrr:::::r ee:::::ee a:::::a
00064         mm:::::m m:::::mm oo:::::oo u:::::u u:::::ut:::::t\n"
00065         " S::::SSSS t:::::t r:::::r e:::::eeee:::::e aaaaaaaaaa:::::a
00066         m:::::mm:::::mo:::::mo:::::ou:::::u u:::::ut:::::t\n"
00067         " SS::::SSSSStttttt:::::ttttt rr:::::rrrr:::::re:::::e e:::::e a:::::a
00068         m:::::mo:::::mo:::::oo:::::oo:::::ou:::::u u:::::uttttt:::::ttttt\n"
00069         " SSS:::::SS t:::::t r:::::r r:::::re:::::e eeeee:::::e aaaaaa:::::a
00070         m:::::mmm:::::mo:::::o o:::::ou:::::u u:::::u t:::::t\n"
00071         " SSSSS:::S t:::::t r:::::r rrrrrre:::::e aa:::::a m:::::m
00072         m:::::m m:::::mo:::::o o:::::ou:::::u u:::::u t:::::t\n"
00073         " S:::::S t:::::t r:::::r e:::::eeeeeeee a:::::aaaa:::::a m:::::m
00074         m:::::m m:::::mo:::::o o:::::ou:::::u u:::::u t:::::t\n"
00075         " S:::::S t:::::t tttttt:::::r e:::::e a:::::a a:::::a m:::::m
00076         m:::::mo:::::o o:::::ou:::::u u:::::u t:::::t tttttt\n"
00077         "SSSSSSS S:::::S t:::::ttr:::::r e:::::e a:::::a a:::::a m:::::m
00078         m:::::m m:::::mo:::::oo:::::ou:::::uu t:::::tttt:::::t\n"
00079         "S:::::SSSSSS:::S tt:::::tr:::::r e:::::eeeeeeaa:::::aaaa:::::a m:::::m
00080         m:::::m m:::::mo:::::o u:::::u tt:::::t\n"
00081         "S:::::SS tt:::::tr:::::r ee:::::ee a:::::aa:::am:::::m
00082         m:::::m m:::::mo o:::::oo uu:::::uu tt:::::tt\n"
00083         " SSSSSSSSSSSSS      tttttttttt rrrrrrr eeeeeeeeeeee aaaaaaaaa aaammmmmm
00084         mmmmmmm mmmmmmm oooooooooo uuuuuuuu uuuu tttttttttt {} \n"
```



```

00069 "\n",
00070 fmt::format(fg(fmt::color::red) | fmt::emphasis::bold, "v{}", streamout_version.to_string());
00071 // clang-format on
00072 log()->info("*****");
00073 log()->info("Streamout Version : {}", streamout_version.to_string());
00074 log()->info("Using InterfaceReader {} version {}", m_Source.getName(),
m_Source.getVersion().to_string());
00075 log()->info("Using InterfaceWriter {} version {}", m_Destination.getName(),
m_Destination.getVersion().to_string());
00076
00077 VersionInfos version;
00078 version.setLibraryInfos("streamout", streamout_version);
00079 version.setReaderInfos(m_Source.getName(), m_Source.getVersion());
00080 version.setWriterInfos(m_Destination.getName(), m_Destination.getVersion());
00081
00082 if(!m_Destination.checkCompatibility(m_Source.getName(), m_Source.getVersion().to_string()))
00083 {
00084     log()->critical("{} version {} is not compatible with {} version {} ! ", m_Source.getName(),
m_Source.getVersion().to_string(), m_Destination.getName(), m_Destination.getVersion().to_string());
00085     log()->info("Compatible Interfaces for {} are", m_Destination.getName());
00086     for(std::map<std::string, std::string>::iterator it = m_Destination.getCompatibility().begin();
it != m_Destination.getCompatibility().end(); ++it) { log()->info("{} version {}", it->first,
it->second); }
00087     std::exit(-1);
00088 }
00089 if(!m_DetectorIDs.empty())
00090 {
00091     std::string ids;
00092     for(std::vector<DetectorID>::const_iterator it = m_DetectorIDs.cbegin(); it !=
m_DetectorIDs.cend(); ++it) ids += std::to_string(static_cast<std::uint16_t>(*it)) + ",";
00093     log()->info("Detector ID(s) other than {} will be ignored", ids);
00094 }
00095 log()->info("*****");
00096 RawBufferNavigator bufferNavigator;
00097 Timer timer;
00098 timer.start();
00099 m_Source.start(version);
00100 m_Destination.start(version);
00101 while(m_Source.nextEvent() && m_NbrEventsToProcess >= m_NbrEvents)
00102 {
00103     m_Destination.setEventNumber(m_Source.getEventNumber());
00104     /******
00105     /*** START EVENT ***/
00106     m_Source.startEvent();
00107     m_Destination.startEvent();
00108     /******
00109
00110     m_Logger->warn("====* Event {} *====", m_NbrEvents);
00111     while(m_Source.nextDIFbuffer())
00112     {
00113         const Buffer& buffer = m_Source.getBuffer();
00114
00115         bufferNavigator.setBuffer(buffer);
00116         if(std::find(m_DetectorIDs.begin(), m_DetectorIDs.end(),
static_cast<DetectorID>(bufferNavigator.getDetectorID())) == m_DetectorIDs.end())
00117         {
00118             m_Logger->debug("Ignoring detector ID : {}", bufferNavigator.getDetectorID());
00119             continue;
00120         }
00121
00122         std::int32_t idstart = bufferNavigator.getStartOfPayload();
00123         if(m_Debug && idstart == -1) m_Logger->info(to_hex(buffer));
00124         c.DIFStarter[idstart]++;
00125
00126         /******
00127         /*** START DIF ***/
00128         m_Source.startDIF();
00129         m_Destination.startDIF();
00130         /******
00131
00132         PayloadLoader payloadLoader;
00133
00134         std::unique_ptr<Payload>& d = payloadLoader.getPayload(bufferNavigator.getDetectorID());
00135         if(d == nullptr)
00136         {
00137             m_Logger->error("streamout don't know how to parse the payload for detector_id {} !
SKIPPING !", bufferNavigator.getDetectorID());
00138             continue;
00139         }
00140
00141         // This is really a big error so skip DIF entirely if exception occurs
00142         try
00143         {
00144             d->setBuffer(bufferNavigator.getPayload());
00145             m_Logger->info("Parsing payload DIF_ID {} (detector_id {})", d->getDIFid(),
bufferNavigator.getDetectorID());
00146         }

```

```

00147         catch(const Exception& e)
00148         {
00149             m_Logger->error("{} ", e.what());
00150             continue;
00151         }
00152
00153         if(buffer.end() != d->end()) m_Logger->error("DIF BUFFER END {} {} ", fmt::ptr(buffer.end()),
fmt::ptr(d->end()));
00154         assert(buffer.end() == d->end());
00155
00156         c.DIFPtrValueAtReturnedPos[d->begin()[d->getEndOfDIFData() - 3]]++;
00157         assert(d->begin()[d->getEndOfDIFData() - 3] == 0xa0);
00158
00159         c.SizeAfterDIFPtr[d->getSizeAfterDIFPtr()]++;
00160         m_Destination.processDIF(*d);
00161         for(std::size_t i = 0; i < d->getNumberOfFrames(); ++i)
00162         {
00163             //
00164             m_Source.startFrame();
00165             m_Destination.startFrame();
00166             //
00167             m_Destination.processFrame(*d, i);
00168             for(std::size_t j = 0; j < static_cast<std::size_t>(Hardware::NUMBER_PAD); ++j)
00169             {
00170                 if(d->getThresholdStatus(i, j) != 0)
00171                 {
00172                     m_Source.startPad();
00173                     m_Destination.startPad();
00174                     m_Destination.processPadInFrame(*d, i, j);
00175                     m_Source.endPad();
00176                     m_Destination.endPad();
00177                 }
00178             }
00179             //
00180             m_Source.endFrame();
00181             m_Destination.endFrame();
00182             //
00183         }
00184         // If I want SlowControl I need to check for it first, If there is an error then it's not a
big deal just continue and say is bad SlowControl
00185         /*try
00186         {
00187             d.setSCBuffer();
00188         }
00189         catch(const Exception& e)
00190         {
00191             m_Logger->error("{} ", e.what());
00192         }
00193
00194         bool processSC = false;
00195         if(d.hasSlowControl())
00196         {
00197             c.hasSlowControl++;
00198             processSC = true;
00199         }
00200         if(d.badSCData())
00201         {
00202             c.hasBadSlowControl++;
00203             processSC = false;
00204         }
00205         if(processSC) { m_Destination.processSlowControl(d.getSCBuffer()); }*/
00206
00207         // Buffer eod = d.getEndOfAllData();
00208         // c.SizeAfterAllData[eod.size()]++;
00209         // bit8_t* debug_variable_3 = eod.end();
00210         // if(buffer.end() != debug_variable_3) m_Logger->info("END DATA BUFFER END {} {} ",
fmt::ptr(buffer.end()), fmt::ptr(debug_variable_3));
00211         // assert(buffer.end() == debug_variable_3);
00212         // if(eod.size() != 0) m_Logger->info("End of Data remaining stuff : {} ", to_hex(eod));*/
00213
00214         /*int nonzeroCount = 0;
00215         for(bit8_t* it = eod.begin(); it != eod.end(); it++)
00216             if(static_cast<int>(*it) != 0) nonzeroCount++;
00217         c.NonZeroValusAtEndOfData[nonzeroCount]++;*/
00218
00219         //
00220         //
00221         m_Source.endDIF();
00222         m_Destination.endDIF();
00223         //
00224     } // end of DIF while loop
00225     m_Logger->warn("====* Event {} *====", m_NbrEvents);
00226     m_NbrEvents++;
00227     /******
00228     /*** END EVENT ***/
00229     m_Source.endEvent();
00230     m_Destination.endEvent();

```

```

00231 /*****/
00232     } // end of event while loop
00233     m_Destination.end();
00234     m_Source.end();
00235     timer.stop();
00236     fmt::print(fmt::color::green | fmt::emphasis::bold, "=== elapsed time {}ms ({}ms/event)
===\n", timer.getElapsedTime() / 1000, timer.getElapsedTime() / (1000 * m_NbrEvents));
00237     }

```

**4.2.3.4 printAllCounters()** `template<typename SOURCE , typename DESTINATION >`  
`void BufferLooper< SOURCE, DESTINATION >::printAllCounters ( ) [inline]`

Definition at line 238 of file [BufferLooper.h](#).

```
00238 { c.printAllCounters(); }
```

**4.2.3.5 setDetectorIDs()** `template<typename SOURCE , typename DESTINATION >`  
`void BufferLooper< SOURCE, DESTINATION >::setDetectorIDs (`  
 `const std::vector< DetectorID > & detectorIDs ) [inline]`

Definition at line 241 of file [BufferLooper.h](#).

```
00241 { m_DetectorIDs = detectorIDs; }
```

The documentation for this class was generated from the following file:

- [libs/core/include/BufferLooper.h](#)

## 4.3 BufferLooperCounter Struct Reference

```
#include <libs/core/include/BufferLooperCounter.h>
```

### Public Member Functions

- void [printCounter](#) (const std::string &description, const std::map< int, int > &m, const std::ios\_base::fmtflags &base=std::ios\_base::dec)
- void [printAllCounters](#) ()

### Public Attributes

- int [hasSlowControl](#) = 0
- int [hasBadSlowControl](#) = 0
- std::map< int, int > [DIFStarter](#)
- std::map< int, int > [DIFPtrValueAtReturnedPos](#)
- std::map< int, int > [SizeAfterDIFPtr](#)
- std::map< int, int > [SizeAfterAllData](#)
- std::map< int, int > [NonZeroValusAtEndOfData](#)

#### 4.3.1 Detailed Description

Definition at line 12 of file [BufferLooperCounter.h](#).

### 4.3.2 Member Function Documentation

#### 4.3.2.1 printAllCounters() void BufferLooperCounter::printAllCounters ( )

Definition at line 11 of file [BufferLooperCounter.cc](#).

```
00012 {
00013     fmt::print(fg(fmt::color::crimson) | fmt::emphasis::bold, "BUFFER LOOP FINAL STATISTICS : \n");
00014     printCounter("Start of DIF header", DIFStarter);
00015     printCounter("Value after DIF data are processed", DIFPtrValueAtReturnedPos, std::ios_base::hex);
00016     printCounter("Size remaining in buffer after end of DIF data", SizeAfterDIFPtr);
00017     fmt::print(fg(fmt::color::crimson) | fmt::emphasis::bold, "Number of Slow Control found {} out of
which {} are bad\n", hasSlowControl, hasBadSlowControl);
00018     printCounter("Size remaining after all of data have been processed", SizeAfterAllData);
00019     printCounter("Number on non zero values in end of data buffer", NonZeroValusAtEndOfData);
00020 }
```

#### 4.3.2.2 printCounter() void BufferLooperCounter::printCounter ( const std::string & description, const std::map< int, int > & m, const std::ios\_base::fmtflags & base = std::ios\_base::dec )

Definition at line 22 of file [BufferLooperCounter.cc](#).

```
00023 {
00024     std::string out{"statistics for " + description + " : \n"};
00025     for(std::map<int, int>::const_iterator it = m.begin(); it != m.end(); it++)
00026     {
00027         if(it != m.begin()) out += ",";
00028         out += " [";
00029         switch(base)
00030         {
00031             case std::ios_base::dec: out += to_dec(static_cast<std::uint32_t>(it->first)); break;
00032             case std::ios_base::hex: out += to_hex(static_cast<std::uint32_t>(it->first)); break;
00033             case std::ios_base::oct: out += to_oct(static_cast<std::uint32_t>(it->first)); break;
00034             default: out += to_dec(static_cast<std::uint32_t>(it->first)); break;
00035         }
00036         out += "]" + std::to_string(it->second);
00037     }
00038     out += "\n";
00039     fmt::print(fg(fmt::color::crimson) | fmt::emphasis::bold, out);
00040 }
```

### 4.3.3 Member Data Documentation

#### 4.3.3.1 DIFPtrValueAtReturnedPos std::map<int, int> BufferLooperCounter::DIFPtrValueAt↔ReturnedPos

Definition at line 18 of file [BufferLooperCounter.h](#).

#### 4.3.3.2 DIFStarter std::map<int, int> BufferLooperCounter::DIFStarter

Definition at line 17 of file [BufferLooperCounter.h](#).

**4.3.3.3 hasBadSlowControl** `int BufferLooperCounter::hasBadSlowControl = 0`

Definition at line 16 of file [BufferLooperCounter.h](#).

**4.3.3.4 hasSlowControl** `int BufferLooperCounter::hasSlowControl = 0`

Definition at line 15 of file [BufferLooperCounter.h](#).

**4.3.3.5 NonZeroValusAtEndOfData** `std::map<int, int> BufferLooperCounter::NonZeroValusAtEndOfData`

Definition at line 21 of file [BufferLooperCounter.h](#).

**4.3.3.6 SizeAfterAllData** `std::map<int, int> BufferLooperCounter::SizeAfterAllData`

Definition at line 20 of file [BufferLooperCounter.h](#).

**4.3.3.7 SizeAfterDIFPtr** `std::map<int, int> BufferLooperCounter::SizeAfterDIFPtr`

Definition at line 19 of file [BufferLooperCounter.h](#).

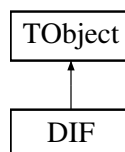
The documentation for this struct was generated from the following files:

- [libs/core/include/BufferLooperCounter.h](#)
- [libs/core/src/BufferLooperCounter.cc](#)

## 4.4 DIF Class Reference

```
#include <libs/interface/ROOT/include/DIF.h>
```

Inheritance diagram for DIF:



## Public Member Functions

- void [clear](#) ()
- void [addHit](#) (const [Hit](#) &)
- void [setID](#) (const std::uint8\_t &)
- std::uint8\_t [getID](#) () const
- void [setDTC](#) (const std::uint32\_t &)
- std::uint32\_t [getDTC](#) () const
- void [setDetectorID](#) (const std::uint32\_t &)
- std::uint8\_t [getDetectorID](#) () const
- void [setGTC](#) (const std::uint32\_t &)
- std::uint32\_t [getGTC](#) () const
- void [setDIFBCID](#) (const std::uint32\_t &)
- std::uint32\_t [getDIFBCID](#) () const
- void [setAbsoluteBCID](#) (const std::uint64\_t &)
- std::uint64\_t [getAbsoluteBCID](#) () const
- std::vector< [Hit](#) >::const\_iterator [cbegin](#) () const
- std::vector< [Hit](#) >::const\_iterator [cend](#) () const

### 4.4.1 Detailed Description

Definition at line 16 of file [DIF.h](#).

### 4.4.2 Member Function Documentation

**4.4.2.1 [addHit\(\)](#)** void [DIF::addHit](#) (  
const [Hit](#) & *hit* )

Definition at line 10 of file [DIF.cc](#).  
00010 { [m\\_Hits.push\\_back](#)(hit); }

**4.4.2.2 [cbegin\(\)](#)** std::vector< [Hit](#) >::const\_iterator [DIF::cbegin](#) ( ) const

Definition at line 32 of file [DIF.cc](#).  
00032 { [return](#) [m\\_Hits.cbegin](#)(); }

**4.4.2.3 [cend\(\)](#)** std::vector< [Hit](#) >::const\_iterator [DIF::cend](#) ( ) const

Definition at line 34 of file [DIF.cc](#).  
00034 { [return](#) [m\\_Hits.cend](#)(); }

**4.4.2.4 clear()** void DIF::clear ( )Definition at line 36 of file [DIF.cc](#).

```
00036 { m_Hits.clear(); }
```

**4.4.2.5 getAbsoluteBCID()** std::uint64\_t DIF::getAbsoluteBCID ( ) constDefinition at line 30 of file [DIF.cc](#).

```
00030 { return m_AbsoluteBCID; }
```

**4.4.2.6 getDetectorID()** std::uint8\_t DIF::getDetectorID ( ) constDefinition at line 40 of file [DIF.cc](#).

```
00040 { return m_DetectorID; }
```

**4.4.2.7 getDIFBCID()** std::uint32\_t DIF::getDIFBCID ( ) constDefinition at line 26 of file [DIF.cc](#).

```
00026 { return m_DIFBCID; }
```

**4.4.2.8 getDTC()** std::uint32\_t DIF::getDTC ( ) constDefinition at line 18 of file [DIF.cc](#).

```
00018 { return m_DTC; }
```

**4.4.2.9 getGTC()** std::uint32\_t DIF::getGTC ( ) constDefinition at line 22 of file [DIF.cc](#).

```
00022 { return m_GTC; }
```

**4.4.2.10 getID()** std::uint8\_t DIF::getID ( ) constDefinition at line 14 of file [DIF.cc](#).

```
00014 { return m_ID; }
```

**4.4.2.11 setAbsoluteBCID()** void DIF::setAbsoluteBCID (   
const std::uint64\_t & *absolutebcid* )

Definition at line 28 of file [DIF.cc](#).

```
00028 { m_AbsoluteBCID = absolutebcid; }
```

**4.4.2.12 setDetectorID()** void DIF::setDetectorID (   
const std::uint32\_t & *detector\_id* )

Definition at line 38 of file [DIF.cc](#).

```
00038 { m_DetectorID = detector_id; }
```

**4.4.2.13 setDIFBCID()** void DIF::setDIFBCID (   
const std::uint32\_t & *difbcid* )

Definition at line 24 of file [DIF.cc](#).

```
00024 { m_DIFBCID = difbcid; }
```

**4.4.2.14 setDTC()** void DIF::setDTC (   
const std::uint32\_t & *dtc* )

Definition at line 16 of file [DIF.cc](#).

```
00016 { m_DTC = dtc; }
```

**4.4.2.15 setGTC()** void DIF::setGTC (   
const std::uint32\_t & *gtc* )

Definition at line 20 of file [DIF.cc](#).

```
00020 { m_GTC = gtc; }
```

**4.4.2.16 setID()** void DIF::setID (   
const std::uint8\_t & *id* )

Definition at line 12 of file [DIF.cc](#).

```
00012 { m_ID = id; }
```

The documentation for this class was generated from the following files:

- [libs/interface/ROOT/include/DIF.h](#)
- [libs/interface/ROOT/src/DIF.cc](#)



## 4.5 DIFPtr Class Reference

M3 MICROROC and HARDROC2 dataformat.

```
#include <libs/core/include/Payload100.h>
```

### 4.5.1 Detailed Description

M3 MICROROC and HARDROC2 dataformat.

Data from the DAQ (once at the beginning of the file) :

*(1 fois par fichier) [Données venant de la DAQ]*

**data format version (8 bits)**

**daq software version (16 bits)**

**SDCC firmware version (16 bits)**

**DIF firmware version (16 bits)**

**timestamp (32bits) (secondes depuis le 01/01/1970)**

**timestamp (32bits) (milliseconde)**



**Explication :**

- **data format version = la version du format de données utilisée, c'est la version 13**
- **daq software version = la version du soft d'acquisition labview ou Xdaq**
- **SDCC firmware version = la version du code VHDL de la carte SDCC**
- **DIF firmware version = la version du code VHDL de la carte DIF**
- **timestamp = secondes et milliseconde depuis le 01/01/1970**

Figure 1 Data from the DAQ (once at the beginning of the file)

Data from the **DIF** analog or/and digital (loop) :

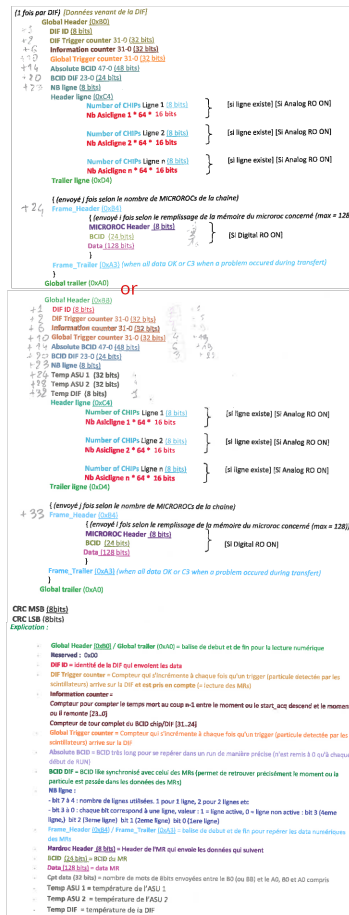


Figure 2 Data from the DIF analog or/and digital

Data from the DAQ (slowcontrol) :

(1 fois par slow control, c'est à dire 1 fois par fichier par DIF) [Données venant de la DAQ]

#### SC Header (0xB1)

**DIF ID (8 bits)**

ASIC Header (8 bits)

Size SC ASIC

[74 ou 109 selon le chip]

SC ASIC (n x 8bits)

[n= 74 ou 109 selon le chip]

**DIF ID (8 bits)**

ASIC Header (8 bits)

Size SC ASIC

[74 ou 109 selon le chip]

SC ASIC (n x 8bits)

[n= 74 ou 109 selon le chip]

...

#### SC Trailer (0xA1)

#### Explication :

- ☛ SC Header (0xB1) / SC Trailer (0xA1) = balise pour repérer les infos sur le Slow Control
- ☛ DIF ID = identité de la DIF qui envoient les data
- ☛ Size SC ASIC = taille de la trame SC d'un CHIP (MR=74 byte, HR = 109 byte)
- ASIC header (8 bits) : header dans le SC
- ☛ SC ASIC (n x 8bits) : de 1 a 48 par DIF moins ceux qui sont bypassés

Figure 3 Data from the DAQ (slowcontrol)

The documentation for this class was generated from the following file:

- [libs/core/include/Payload100.h](#)

## 4.6 DIFSlowControl Class Reference

```
#include <libs/core/include/DIFSlowControl.h>
```

### Public Member Functions

- [DIFSlowControl](#) (const std::uint8\_t &version, const std::uint8\_t &DIFid, unsigned char \*buf)  
*Constructor.*
- std::uint8\_t [getDIFid](#) ()  
*get DIF id*
- std::map< int, std::map< std::string, int > > [getChipsMap](#) ()  
*Get chips map.*
- std::map< std::string, int > [getChipSlowControl](#) (const int &asicid)  
*Get one chip map.*
- int [getChipSlowControl](#) (const std::int8\_t &asicid, const std::string &param)  
*Get one Chip value.*
- std::map< int, std::map< std::string, int > >::const\_iterator [cbegin](#) () const
- std::map< int, std::map< std::string, int > >::const\_iterator [cend](#) () const

### 4.6.1 Detailed Description

Definition at line 13 of file [DIFSlowControl.h](#).

### 4.6.2 Constructor & Destructor Documentation

**4.6.2.1 DIFSlowControl()** `DIFSlowControl::DIFSlowControl ( const std::uint8_t & version, const std::uint8_t & DIFid, unsigned char * buf )`

Constructor.

#### Parameters

<i>version</i>	Data format version
<i>DIFid</i>	DIF id
<i>buf</i>	Pointer to the Raw data buffer

Definition at line 7 of file [DIFSlowControl.cc](#).

```
00007 : m_Version(version), m_DIFid(DifId), m_AsicType(2)
00008 {
00009     if(cbuf[0] != 0xb1) return;
00010     int header_shift{6};
00011     if(m_Version < 8) m_NbrAsic = cbuf[5];
00012     else
00013     {
00014         m_DIFid      = cbuf[1];
00015         m_NbrAsic    = cbuf[2];
00016         header_shift = 3;
00017     }
00018     int size_hardroc1 = m_NbrAsic * 72 + header_shift + 1;
00019     if(cbuf[size_hardroc1 - 1] != 0xal) size_hardroc1 = 0;
00020
00021     int size_hardroc2 = m_NbrAsic * 109 + header_shift + 1;
00022     if(cbuf[size_hardroc2 - 1] != 0xal) size_hardroc2 = 0;
00023     if(size_hardroc1 != 0)
00024     {
00025         FillHR1(header_shift, cbuf);
00026         m_AsicType = 1;
00027     }
00028     else if(size_hardroc2 != 0)
00029         FillHR2(header_shift, cbuf);
00030     else
00031         return;
00032 }
```

### 4.6.3 Member Function Documentation

**4.6.3.1 cbegin()** `std::map< int, std::map< std::string, int > >::const_iterator DIFSlowControl::cbegin ( ) const [inline]`

Definition at line 47 of file [DIFSlowControl.h](#).

```
00047 { return m_MapSC.cbegin(); }
```

**4.6.3.2 cend()** `std::map< int, std::map< std::string, int > >::const_iterator DIFSlowControl::cend ( ) const [inline]`

Definition at line 49 of file [DIFSlowControl.h](#).

```
00049 { return m_MapSC.cend(); }
```

**4.6.3.3 getChipSlowControl()** [1/2] `std::map< std::string, int > DIFSlowControl::getChipSlowControl ( const int & asicid ) [inline]`

Get one chip map.

#### Parameters

<i>asicid</i>	ASIC ID
---------------	---------

#### Returns

a map of <string (parameter name),int (parameter value) >

Definition at line 38 of file [DIFSlowControl.cc](#).

```
00038 { return m_MapSC[asicid]; }
```

**4.6.3.4 getChipSlowControl()** [2/2] `int DIFSlowControl::getChipSlowControl ( const std::int8_t & asicid, const std::string & param ) [inline]`

Get one Chip value.

#### Parameters

<i>asicid</i>	ASic ID
<i>param</i>	Parameter name

Definition at line 40 of file [DIFSlowControl.cc](#).

```
00040 { return getChipSlowControl(asicid)[param]; }
```

**4.6.3.5 getChipsMap()** `std::map< int, std::map< std::string, int > > DIFSlowControl::getChipsMap ( ) [inline]`

Get chips map.

#### Returns

a map of < Asic Id, map of <string (parameter name),int (parameter value) >

Definition at line 36 of file [DIFSlowControl.cc](#).

```
00036 { return m_MapSC; }
```

**4.6.3.6 getDIFId()** `std::uint8_t DIFSlowControl::getDIFId ( ) [inline]`

get DIF id

Definition at line 34 of file [DIFSlowControl.cc](#).

```
00034 { return m_DIFId; }
```

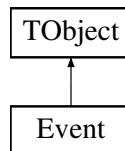
The documentation for this class was generated from the following files:

- [libs/core/include/DIFSlowControl.h](#)
- [libs/core/src/DIFSlowControl.cc](#)

## 4.7 Event Class Reference

```
#include <libs/interface/ROOT/include/Event.h>
```

Inheritance diagram for Event:



### Public Member Functions

- `std::uint32_t` [getEventNumber](#) ( )
- `void` [setEventNumber](#) (const `std::uint32_t` &evtNbr)
- `void` [clear](#) ( )
- `void` [addDIF](#) (const [DIF](#) &dif)
- `std::map< std::uint8_t, DIF >::const_iterator` [cbegin](#) ( ) const
- `std::map< std::uint8_t, DIF >::const_iterator` [cend](#) ( ) const

### 4.7.1 Detailed Description

Definition at line 15 of file [Event.h](#).

### 4.7.2 Member Function Documentation

**4.7.2.1 addDIF()** `void Event::addDIF ( const DIF & dif )`

Definition at line 14 of file [Event.cc](#).

```
00014 { DIFs[dif.getID()] = dif; }
```

**4.7.2.2 cbegin()** `std::map< std::uint8_t, DIF >::const_iterator Event::cbegin ( ) const`

Definition at line 16 of file [Event.cc](#).

```
00016 { return DIFs.cbegin(); }
```

**4.7.2.3 cend()** `std::map< std::uint8_t, DIF >::const_iterator Event::cend ( ) const`

Definition at line 18 of file [Event.cc](#).

```
00018 { return DIFs.cend(); }
```

**4.7.2.4 clear()** `void Event::clear ( )`

Definition at line 12 of file [Event.cc](#).

```
00012 { DIFs.clear(); }
```

**4.7.2.5 getEventNumber()** `std::uint32_t Event::getEventNumber ( )`

Definition at line 8 of file [Event.cc](#).

```
00008 { return m_EventNumber; }
```

**4.7.2.6 setEventNumber()** `void Event::setEventNumber ( const std::uint32_t & evtNbr )`

Definition at line 10 of file [Event.cc](#).

```
00010 { m_EventNumber = evtNbr; }
```

The documentation for this class was generated from the following files:

- [libs/interface/ROOT/include/Event.h](#)
- [libs/interface/ROOT/src/Event.cc](#)

## 4.8 Exception Class Reference

```
#include <libs/core/include/Exception.h>
```

### Public Member Functions

- virtual const char \* [what](#) ( ) const noexcept
- [Exception](#) (const std::string &[message](#))
- [Exception](#) (const std::int32\_t &[error](#), const std::string &[message](#))
- std::int32\_t [error](#) ( )
- std::string [message](#) ( )

### 4.8.1 Detailed Description

Definition at line 11 of file [Exception.h](#).

### 4.8.2 Constructor & Destructor Documentation

**4.8.2.1 Exception()** [1/2] `Exception::Exception ( const std::string & message ) [inline], [explicit]`

Definition at line 15 of file [Exception.h](#).

```
00015 : m_Message(message) { constructWhat(); }
```

**4.8.2.2 Exception()** [2/2] `Exception::Exception ( const std::int32_t & error, const std::string & message ) [inline]`

Definition at line 16 of file [Exception.h](#).

```
00016 : m_Error(error), m_Message(message) { constructWhat(); }
```

### 4.8.3 Member Function Documentation

**4.8.3.1 error()** `std::int32_t Exception::error ( ) [inline]`

Definition at line 17 of file [Exception.h](#).

```
00017 { return m_Error; }
```

**4.8.3.2 message()** `std::string Exception::message ( ) [inline]`

Definition at line 18 of file [Exception.h](#).

```
00018 { return m_Message; }
```

**4.8.3.3 what()** `virtual const char * Exception::what ( ) const [inline], [virtual], [noexcept]`

Definition at line 14 of file [Exception.h](#).

```
00014 { return m_What.c_str(); }
```

The documentation for this class was generated from the following file:

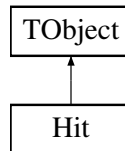
- [libs/core/include/Exception.h](#)



## 4.9 Hit Class Reference

```
#include <libs/interface/ROOT/include/Hit.h>
```

Inheritance diagram for Hit:



### Public Member Functions

- void [clear](#) ()
- void [setDIF](#) (const std::uint8\_t &)
- void [setASIC](#) (const std::uint8\_t &)
- void [setChannel](#) (const std::uint8\_t &)
- void [setThreshold](#) (const std::uint8\_t &)
- void [setDTC](#) (const std::uint32\_t &)
- void [setGTC](#) (const std::uint32\_t &)
- void [setDIFBCID](#) (const std::uint32\_t &)
- void [setFrameBCID](#) (const std::uint32\_t &)
- void [setTimestamp](#) (const std::uint32\_t &)
- void [setAbsoluteBCID](#) (const std::uint64\_t &)
- std::uint8\_t [getDIFid](#) () const
- std::uint8\_t [getASICid](#) () const
- std::uint8\_t [getChannel](#) () const
- std::uint8\_t [getThreshold](#) () const
- std::uint32\_t [getDTC](#) () const
- std::uint32\_t [getGTC](#) () const
- std::uint32\_t [getDIFBCID](#) () const
- std::uint32\_t [getFrameBCID](#) () const
- std::uint32\_t [getTimestamp](#) () const
- std::uint64\_t [getAbsoluteBCID](#) () const

### 4.9.1 Detailed Description

Definition at line 10 of file [Hit.h](#).

### 4.9.2 Member Function Documentation

#### 4.9.2.1 clear() void Hit::clear ( )

Definition at line 7 of file [Hit.cc](#).

```
00008 {
00009     m_DIF           = 0;
00010     m_ASIC          = 0;
00011     m_Channel       = 0;
00012     m_Threshold     = 0;
00013     m_DTC           = 0;
00014     m_GTC           = 0;
00015     m_DIFBCID      = 0;
00016     m_FrameBCID    = 0;
00017     m_Timestamp     = 0;
00018     m_AbsoluteBCID = 0;
00019 }
```

#### 4.9.2.2 getAbsoluteBCID() std::uint64\_t Hit::getAbsoluteBCID ( ) const

Definition at line 59 of file [Hit.cc](#).

```
00059 { return m_AbsoluteBCID; }
```

#### 4.9.2.3 getASICid() std::uint8\_t Hit::getASICid ( ) const

Definition at line 43 of file [Hit.cc](#).

```
00043 { return m_ASIC; }
```

#### 4.9.2.4 getChannel() std::uint8\_t Hit::getChannel ( ) const

Definition at line 45 of file [Hit.cc](#).

```
00045 { return m_Channel; }
```

#### 4.9.2.5 getDIFBCID() std::uint32\_t Hit::getDIFBCID ( ) const

Definition at line 53 of file [Hit.cc](#).

```
00053 { return m_DIFBCID; }
```

#### 4.9.2.6 getDIFid() std::uint8\_t Hit::getDIFid ( ) const

Definition at line 41 of file [Hit.cc](#).

```
00041 { return m_DIF; }
```

#### 4.9.2.7 getDTC() std::uint32\_t Hit::getDTC ( ) const

Definition at line 49 of file [Hit.cc](#).

```
00049 { return m_DTC; }
```

**4.9.2.8 getFrameBCID()** `std::uint32_t Hit::getFrameBCID ( ) const`Definition at line 55 of file [Hit.cc](#).

```
00055 { return m_FrameBCID; }
```

**4.9.2.9 getGTC()** `std::uint32_t Hit::getGTC ( ) const`Definition at line 51 of file [Hit.cc](#).

```
00051 { return m_GTC; }
```

**4.9.2.10 getThreshold()** `std::uint8_t Hit::getThreshold ( ) const`Definition at line 47 of file [Hit.cc](#).

```
00047 { return m_Threshold; }
```

**4.9.2.11 getTimestamp()** `std::uint32_t Hit::getTimestamp ( ) const`Definition at line 57 of file [Hit.cc](#).

```
00057 { return m_Timestamp; }
```

**4.9.2.12 setAbsoluteBCID()** `void Hit::setAbsoluteBCID ( const std::uint64_t & absolutebcid )`Definition at line 39 of file [Hit.cc](#).

```
00039 { m_AbsoluteBCID = absolutebcid; }
```

**4.9.2.13 setASIC()** `void Hit::setASIC ( const std::uint8_t & asic )`Definition at line 23 of file [Hit.cc](#).

```
00023 { m_ASIC = asic; }
```

**4.9.2.14 setChannel()** `void Hit::setChannel ( const std::uint8_t & channel )`Definition at line 25 of file [Hit.cc](#).

```
00025 { m_Channel = channel; }
```

**4.9.2.15 setDIF()** void Hit::setDIF (   
const std::uint8\_t & dif )

Definition at line 21 of file [Hit.cc](#).

```
00021 { m_DIF = dif; }
```

**4.9.2.16 setDIFBCID()** void Hit::setDIFBCID (   
const std::uint32\_t & difbcid )

Definition at line 33 of file [Hit.cc](#).

```
00033 { m_DIFBCID = difbcid; }
```

**4.9.2.17 setDTC()** void Hit::setDTC (   
const std::uint32\_t & dtc )

Definition at line 29 of file [Hit.cc](#).

```
00029 { m_DTC = dtc; }
```

**4.9.2.18 setFrameBCID()** void Hit::setFrameBCID (   
const std::uint32\_t & framebcid )

Definition at line 35 of file [Hit.cc](#).

```
00035 { m_FrameBCID = framebcid; }
```

**4.9.2.19 setGTC()** void Hit::setGTC (   
const std::uint32\_t & gtc )

Definition at line 31 of file [Hit.cc](#).

```
00031 { m_GTC = gtc; }
```

**4.9.2.20 setThreshold()** void Hit::setThreshold (   
const std::uint8\_t & threshold )

Definition at line 27 of file [Hit.cc](#).

```
00027 { m_Threshold = threshold; }
```

**4.9.2.21 setTimestamp()** void Hit::setTimestamp (   
const std::uint32\_t & timestamp )

Definition at line 37 of file [Hit.cc](#).

```
00037 { m_Timestamp = timestamp; }
```

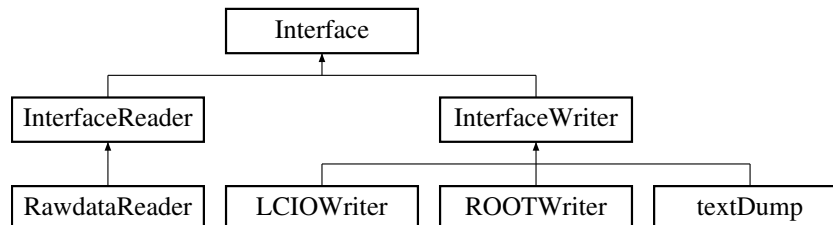
The documentation for this class was generated from the following files:

- [libs/interface/ROOT/include/Hit.h](#)
- [libs/interface/ROOT/src/Hit.cc](#)

## 4.10 Interface Class Reference

```
#include <libs/core/include/Interface.h>
```

Inheritance diagram for Interface:



### Public Member Functions

- [Interface](#) (const std::string &name, const std::string &version, const [InterfaceType](#) &type)
- virtual [~Interface](#) ()=default
- virtual void [start](#) (const [VersionInfos](#) &ver)
- virtual void [end](#) ()
- virtual void [startEvent](#) ()
- virtual void [endEvent](#) ()
- virtual void [startDIF](#) ()
- virtual void [endDIF](#) ()
- virtual void [startFrame](#) ()
- virtual void [endFrame](#) ()
- virtual void [startPad](#) ()
- virtual void [endPad](#) ()
- std::shared\_ptr< spdlog::logger > & [log](#) ()
- void [setLogger](#) (const std::shared\_ptr< spdlog::logger > &logger)
- std::string [getName](#) ()
- [Version](#) [getVersion](#) ()
- std::uint32\_t [getEventNumber](#) ()
- void [setEventNumber](#) (const std::uint32\_t &nbr)
- std::uint32\_t [getRunNumber](#) ()
- void [setRunNumber](#) (const std::uint32\_t &nbr)

### Protected Attributes

- std::uint32\_t [m\\_EventNumber](#) {0}
- std::uint32\_t [m\\_RunNumber](#) {0}

#### 4.10.1 Detailed Description

Definition at line 39 of file [Interface.h](#).

#### 4.10.2 Constructor & Destructor Documentation

**4.10.2.1 Interface()** `Interface::Interface (`  
    `const std::string & name,`  
    `const std::string & version,`  
    `const InterfaceType & type ) [inline]`

Definition at line 42 of file [Interface.h](#).

```
00042 : m_Name(name), m_Version(version) {}
```

**4.10.2.2 ~Interface()** `virtual Interface::~~Interface ( ) [virtual], [default]`

### 4.10.3 Member Function Documentation

**4.10.3.1 end()** `virtual void Interface::end ( ) [inline], [virtual]`

Reimplemented in [textDump](#), [LCIOWriter](#), [RawdataReader](#), and [ROOTWriter](#).

Definition at line 45 of file [Interface.h](#).

```
00045 {}
```

**4.10.3.2 endDIF()** `virtual void Interface::endDIF ( ) [inline], [virtual]`

Reimplemented in [LCIOWriter](#), and [ROOTWriter](#).

Definition at line 49 of file [Interface.h](#).

```
00049 {}
```

**4.10.3.3 endEvent()** `virtual void Interface::endEvent ( ) [inline], [virtual]`

Reimplemented in [LCIOWriter](#), and [ROOTWriter](#).

Definition at line 47 of file [Interface.h](#).

```
00047 {}
```

**4.10.3.4 endFrame()** `virtual void Interface::endFrame ( ) [inline], [virtual]`

Reimplemented in [LCIOWriter](#), and [ROOTWriter](#).

Definition at line 51 of file [Interface.h](#).

```
00051 {}
```

**4.10.3.5 endPad()** virtual void Interface::endPad ( ) [inline], [virtual]

Reimplemented in [LCIOWriter](#), and [ROOTWriter](#).

Definition at line 53 of file [Interface.h](#).

```
00053 {}
```

**4.10.3.6 getEventNumber()** std::uint32\_t Interface::getEventNumber ( ) [inline]

Definition at line 58 of file [Interface.h](#).

```
00058 { return m_EventNumber; }
```

**4.10.3.7 getName()** std::string Interface::getName ( ) [inline]

Definition at line 56 of file [Interface.h](#).

```
00056 { return m_Name; }
```

**4.10.3.8 getRunNumber()** std::uint32\_t Interface::getRunNumber ( ) [inline]

Definition at line 60 of file [Interface.h](#).

```
00060 { return m_RunNumber; }
```

**4.10.3.9 getVersion()** Version Interface::getVersion ( ) [inline]

Definition at line 57 of file [Interface.h](#).

```
00057 { return m_Version; }
```

**4.10.3.10 log()** std::shared\_ptr< spdlog::logger > & Interface::log ( ) [inline]

Definition at line 54 of file [Interface.h](#).

```
00054 { return m_Logger; }
```

**4.10.3.11 setEventNumber()** void Interface::setEventNumber (   
const std::uint32\_t & nbr ) [inline]

Definition at line 59 of file [Interface.h](#).

```
00059 { m_EventNumber = nbr; }
```

**4.10.3.12 setLogger()** `void Interface::setLogger ( const std::shared_ptr< spdlog::logger > & logger ) [inline]`

Definition at line 55 of file [Interface.h](#).

```
00055 { m_Logger = logger; }
```

**4.10.3.13 setRunNumber()** `void Interface::setRunNumber ( const std::uint32_t & nbr ) [inline]`

Definition at line 61 of file [Interface.h](#).

```
00061 { m_RunNumber = nbr; }
```

**4.10.3.14 start()** `virtual void Interface::start ( const VersionInfos & ver ) [inline], [virtual]`

Reimplemented in [ROOTWriter](#), [textDump](#), [LCIOWriter](#), and [RawdataReader](#).

Definition at line 44 of file [Interface.h](#).

```
00044 {}
```

**4.10.3.15 startDIF()** `virtual void Interface::startDIF ( ) [inline], [virtual]`

Reimplemented in [LCIOWriter](#), and [ROOTWriter](#).

Definition at line 48 of file [Interface.h](#).

```
00048 {}
```

**4.10.3.16 startEvent()** `virtual void Interface::startEvent ( ) [inline], [virtual]`

Reimplemented in [LCIOWriter](#), and [ROOTWriter](#).

Definition at line 46 of file [Interface.h](#).

```
00046 {}
```

**4.10.3.17 startFrame()** `virtual void Interface::startFrame ( ) [inline], [virtual]`

Reimplemented in [LCIOWriter](#), and [ROOTWriter](#).

Definition at line 50 of file [Interface.h](#).

```
00050 {}
```



**4.10.3.18 startPad()** `virtual void Interface::startPad ( ) [inline], [virtual]`

Reimplemented in [LCIOWriter](#), and [ROOTWriter](#).

Definition at line 52 of file [Interface.h](#).

```
00052 {}
```

#### 4.10.4 Member Data Documentation

**4.10.4.1 m\_EventNumber** `std::uint32_t Interface::m_EventNumber {0} [protected]`

Definition at line 64 of file [Interface.h](#).

**4.10.4.2 m\_RunNumber** `std::uint32_t Interface::m_RunNumber {0} [protected]`

Definition at line 65 of file [Interface.h](#).

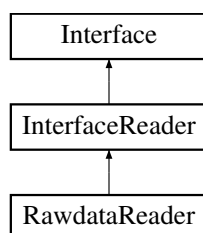
The documentation for this class was generated from the following file:

- [libs/core/include/Interface.h](#)

### 4.11 InterfaceReader Class Reference

```
#include <libs/core/include/Interface.h>
```

Inheritance diagram for InterfaceReader:



#### Public Member Functions

- [InterfaceReader](#) (const std::string &name, const std::string &version)
- virtual [~InterfaceReader](#) ()=default

#### Protected Attributes

- Buffer [m\\_Buffer](#)

### 4.11.1 Detailed Description

Definition at line 74 of file [Interface.h](#).

### 4.11.2 Constructor & Destructor Documentation

**4.11.2.1 InterfaceReader()** `InterfaceReader::InterfaceReader ( const std::string & name, const std::string & version ) [inline]`

Definition at line 77 of file [Interface.h](#).

```
00077 : Interface(name, version, InterfaceType::Reader) {}
```

**4.11.2.2 ~InterfaceReader()** `virtual InterfaceReader::~~InterfaceReader ( ) [virtual], [default]`

### 4.11.3 Member Data Documentation

**4.11.3.1 m\_Buffer** `Buffer InterfaceReader::m_Buffer [protected]`

Definition at line 81 of file [Interface.h](#).

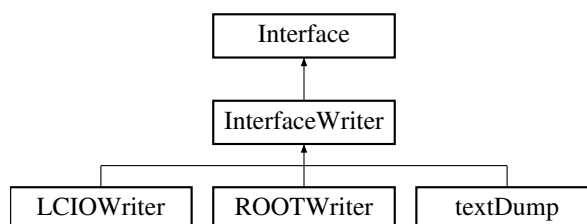
The documentation for this class was generated from the following file:

- [libs/core/include/Interface.h](#)

## 4.12 InterfaceWriter Class Reference

```
#include <libs/core/include/Interface.h>
```

Inheritance diagram for InterfaceWriter:



## Public Member Functions

- [InterfaceWriter](#) (const std::string &name, const std::string &version)
- void [addCompatibility](#) (const std::string &name, const std::string &version)
- std::map< std::string, std::string > [getCompatibility](#) ()
- bool [checkCompatibility](#) (const std::string &name, const std::string &version)
- virtual [~InterfaceWriter](#) ()=default

## Additional Inherited Members

### 4.12.1 Detailed Description

Definition at line 84 of file [Interface.h](#).

### 4.12.2 Constructor & Destructor Documentation

**4.12.2.1 InterfaceWriter()** `InterfaceWriter::InterfaceWriter (`  
    `const std::string & name,`  
    `const std::string & version ) [inline]`

Definition at line 87 of file [Interface.h](#).

```
00087 : Interface(name, version, InterfaceType::Writer) {}
```

**4.12.2.2 ~InterfaceWriter()** `virtual InterfaceWriter::~~InterfaceWriter ( ) [virtual], [default]`

### 4.12.3 Member Function Documentation

**4.12.3.1 addCompatibility()** `void InterfaceWriter::addCompatibility (`  
    `const std::string & name,`  
    `const std::string & version ) [inline]`

Definition at line 89 of file [Interface.h](#).

```
00089 { m_Compatible[name] = version; }
```

**4.12.3.2 checkCompatibility()** `bool InterfaceWriter::checkCompatibility ( const std::string & name, const std::string & version ) [inline]`

Definition at line 93 of file [Interface.h](#).

```
00094 {
00095     if(m_Compatible.find(name) != m_Compatible.end())
00096     {
00097         auto         ran = semver::range::detail::range(m_Compatible[name]);
00098         semver::version ver = semver::version(version);
00099         if(ran.satisfies(ver, false)) { return true; }
00100         else
00101             return false;
00102     }
00103     else
00104         return false;
00105 }
```

**4.12.3.3 getCompatibility()** `std::map< std::string, std::string > InterfaceWriter::getCompatibility ( ) [inline]`

Definition at line 91 of file [Interface.h](#).

```
00091 { return m_Compatible; }
```

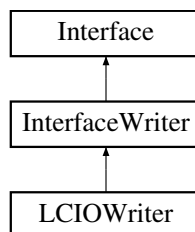
The documentation for this class was generated from the following file:

- [libs/core/include/Interface.h](#)

## 4.13 LCIOWriter Class Reference

```
#include <libs/interface/LCIO/include/LCIOWriter.h>
```

Inheritance diagram for LCIOWriter:



### Public Member Functions

- [LCIOWriter](#) ()
- void [setFilename](#) (const std::string &)
- void [start](#) (const [VersionInfos](#) &ver) final
- void [processDIF](#) (const [Payload](#) &)
- void [processFrame](#) (const [Payload](#) &, const std::uint32\_t &frameIndex)
- void [processPadInFrame](#) (const [Payload](#) &, const std::uint32\_t &frameIndex, const std::uint32\_t &channelIndex)
- void [processSlowControl](#) (const [Buffer](#) &)
- void [end](#) ()
- virtual void [startEvent](#) ()
- virtual void [endEvent](#) ()
- virtual void [startDIF](#) ()
- virtual void [endDIF](#) ()
- virtual void [startFrame](#) ()
- virtual void [endFrame](#) ()
- virtual void [startPad](#) ()
- virtual void [endPad](#) ()

## Additional Inherited Members

### 4.13.1 Detailed Description

Definition at line 19 of file [LCIOWriter.h](#).

### 4.13.2 Constructor & Destructor Documentation

#### 4.13.2.1 LCIOWriter() LCIOWriter::LCIOWriter ( )

Definition at line 20 of file [LCIOWriter.cc](#).

```
00020 :   InterfaceWriter("LCIOWriter", "1.0.0"),
      m_LCWriter(IOIMPL::LCFactory::getInstance()->createLCWriter()) { addCompatibility("RawdataReader",
      ">=1.0.0"); }
```

### 4.13.3 Member Function Documentation

#### 4.13.3.1 end() void LCIOWriter::end ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 44 of file [LCIOWriter.cc](#).

```
00044 { m_LCWriter->close(); }
```

#### 4.13.3.2 endDIF() void LCIOWriter::endDIF ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 104 of file [LCIOWriter.cc](#).

```
00104 {}
```

#### 4.13.3.3 endEvent() void LCIOWriter::endEvent ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 96 of file [LCIOWriter.cc](#).

```
00097 {
00098   m_LCEvent->addCollection(m_CollectionVec, "DHCALRawHits");
00099   m_LCWriter->writeEvent(m_LCEvent.get());
00100 }
```

**4.13.3.4 endFrame()** void LCIOWriter::endFrame ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 108 of file [LCIOWriter.cc](#).

```
00108 {}
```

**4.13.3.5 endPad()** void LCIOWriter::endPad ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 112 of file [LCIOWriter.cc](#).

```
00112 {}
```

**4.13.3.6 processDIF()** void LCIOWriter::processDIF (   
const [Payload](#) & d )

Definition at line 46 of file [LCIOWriter.cc](#).

```
00047 {
00048     std::string parameter_name = "DIF" + std::to_string(d.getDIFid()) + "_Triggers";
00049     EVENT::IntVec parameters;
00050     parameters.push_back(d.getDTC());
00051     parameters.push_back(d.getGTC());
00052     parameters.push_back(d.getBCID());
00053     parameters.push_back(d.getAbsoluteBCID() & 0xFFFFFF);
00054     parameters.push_back((d.getAbsoluteBCID() >> 24) & 0xFFFFFF);
00055     parameters.push_back(0);
00056     parameters.push_back(0);
00057     parameters.push_back(0);
00058     m_CollectionVec->parameters().setValues("DIF" + std::to_string(d.getDIFid()) + "_Triggers",
parameters);
00059     parameter_name = "DIF_DetectorID_" + std::to_string(d.getDIFid());
00060     m_CollectionVec->parameters().setValue(parameter_name, static_cast<int>(d.getDetectorID()));
00061 }
```

**4.13.3.7 processFrame()** void LCIOWriter::processFrame (   
const [Payload](#) & d,   
const std::uint32\_t & frameIndex )

Definition at line 63 of file [LCIOWriter.cc](#).

```
00063 {}
```

**4.13.3.8 processPadInFrame()** void LCIOWriter::processPadInFrame (   
const [Payload](#) & d,   
const std::uint32\_t & frameIndex,   
const std::uint32\_t & channelIndex )

Definition at line 65 of file [LCIOWriter.cc](#).

```
00066 {
00067     m_LCEvent->setTimeStamp(d.getAbsoluteBCID() * 200);
00068     m_LCEvent->setRunNumber(getRunNumber());
00069     IMPL::RawCalorimeterHitImpl* hit = new IMPL::RawCalorimeterHitImpl;
00070     int ID0 = channelIndex;
00071     ID0 = ID0 << 8;
00072     ID0 += d.getAsICid(frameIndex);
00073     ID0 = ID0 << 8;
00074     ID0 += d.getDIFid();
00075     hit->setCellID0(ID0);
00076     hit->setCellID1(d.getFrameBCID(frameIndex));
00077     hit->setAmplitude(d.getThresholdStatus(frameIndex, channelIndex));
00078     hit->setTimeStamp(d.getFrameTimeToTrigger(frameIndex));
00079     m_CollectionVec->addElement(hit);
00080 }
```

**4.13.3.9 processSlowControl()** void LCIOWriter::processSlowControl ( const Buffer & ) [inline]

Definition at line 30 of file [LCIOWriter.h](#).

```
00030 { ; }
```

**4.13.3.10 setFilename()** void LCIOWriter::setFilename ( const std::string & filename )

Definition at line 18 of file [LCIOWriter.cc](#).

```
00018 { m_Filename = filename; }
```

**4.13.3.11 start()** void LCIOWriter::start ( const VersionInfos & ver ) [final], [virtual]

Reimplemented from [Interface](#).

Definition at line 22 of file [LCIOWriter.cc](#).

```
00023 {
00024     m_LCWriter->open(m_Filename, EVENT::LCIO::WRITE_NEW);
00025     std::unique_ptr<IMPL::LCRunHeaderImpl> runHdr(new IMPL::LCRunHeaderImpl);
00026     std::string filename_ = filename(m_Filename);
00027     std::size_t begin_ = filename_.find_last_of("_R");
00028     if(begin_ == std::string::npos) begin_ = filename_.find_last_of('_');
00029     filename_ = filename_.substr(begin_ + 1);
00030     setRunNumber(stoi(filename_));
00031     runHdr->setRunNumber(getRunNumber());
00032     runHdr->setDetectorName(m_DetectorName);
00033     std::string description("data collected with SDHCAL prototype");
00034     runHdr->setDescription(description);
00035     runHdr->parameters().setValue("Library_Name", ver.getLibraryInfos().first);
00036     runHdr->parameters().setValue("Library_Version", ver.getLibraryInfos().second.to_string());
00037     runHdr->parameters().setValue("Reader_Name", ver.getReaderInfos().first);
00038     runHdr->parameters().setValue("Reader_Version", ver.getReaderInfos().second.to_string());
00039     runHdr->parameters().setValue("Writer_Name", ver.getWriterInfos().first);
00040     runHdr->parameters().setValue("Writer_Version", ver.getWriterInfos().second.to_string());
00041     m_LCWriter->writeRunHeader(runHdr.get());
00042 }
```

**4.13.3.12 startDIF()** void LCIOWriter::startDIF ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 102 of file [LCIOWriter.cc](#).

```
00102 {}
```

**4.13.3.13 startEvent()** void LCIOWriter::startEvent ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 82 of file [LCIOWriter.cc](#).

```
00083 {
00084     m_LCEvent = std::make_unique<IMPL::LCEventImpl>();
00085     m_LCEvent->setEventNumber(getEventNumber());
00086     m_LCEvent->setDetectorName(m_DetectorName);
00087     m_LCEvent->setWeight(1);
00088     m_CollectionVec = new IMPL::LCCollectionVec(EVENT::LCIO::RAWCALORIMETERHIT);
00089     IMPL::LCFlagImpl flag(0);
00090     flag.setBit(EVENT::LCIO::RCHBIT_ID1);
00091     flag.setBit(EVENT::LCIO::RCHBIT_TIME);
00092     m_CollectionVec->setFlag(flag.getFlag());
00093     m_CollectionVec->parameters().setValue(EVENT::LCIO::CellIDEncoding, "dif:8,asic:8,channel:6");
00094 }
```

**4.13.3.14 startFrame()** void LCIOWriter::startFrame ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 106 of file [LCIOWriter.cc](#).

```
00106 {}
```

**4.13.3.15 startPad()** void LCIOWriter::startPad ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 110 of file [LCIOWriter.cc](#).

```
00110 {}
```

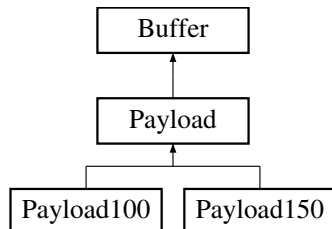
The documentation for this class was generated from the following files:

- [libs/interface/LCIO/include/LCIOWriter.h](#)
- [libs/interface/LCIO/src/LCIOWriter.cc](#)

## 4.14 Payload Class Reference

```
#include <libs/core/include/Payload.h>
```

Inheritance diagram for Payload:



### Public Member Functions

- [Payload](#) (const std::int32\_t &detector\_id)
- void [setBuffer](#) (const [Buffer](#) &buffer)
- std::uint32\_t [getEndOfDIFData](#) () const
- std::uint32\_t [getSizeAfterDIFPtr](#) () const
- virtual std::uint32\_t [getNumberOfFrames](#) () const =0
- virtual std::uint32\_t [getThresholdStatus](#) (const std::uint32\_t &, const std::uint32\_t &) const =0
- virtual std::uint32\_t [getDIFid](#) () const =0
- virtual std::uint32\_t [getDTC](#) () const =0
- virtual std::uint32\_t [getGTC](#) () const =0
- virtual std::uint32\_t [getBCID](#) () const =0
- virtual std::uint64\_t [getAbsoluteBCID](#) () const =0
- virtual std::uint32\_t [getASICid](#) (const std::uint32\_t &) const =0
- virtual std::uint32\_t [getFrameBCID](#) (const std::uint32\_t &) const =0
- virtual std::uint32\_t [getFrameTimeToTrigger](#) (const std::uint32\_t &) const =0
- std::uint32\_t [getDetectorID](#) () const
- virtual [~Payload](#) ()



## Protected Member Functions

- virtual void [parsePayload](#) ()=0

## Protected Attributes

- std::int32\_t [m\\_DetectorID](#) {-1}
- std::uint32\_t [theGetFramePtrReturn\\_](#) {0}

### 4.14.1 Detailed Description

Definition at line 11 of file [Payload.h](#).

### 4.14.2 Constructor & Destructor Documentation

**4.14.2.1 Payload()** `Payload::Payload ( const std::int32_t & detector_id ) [inline], [explicit]`

Definition at line 14 of file [Payload.h](#).  
00014 : [m\\_DetectorID](#)(detector\_id) {}

**4.14.2.2 ~Payload()** `virtual Payload::~~Payload ( ) [inline], [virtual]`

Definition at line 31 of file [Payload.h](#).  
00031 {}

### 4.14.3 Member Function Documentation

**4.14.3.1 getAbsoluteBCID()** `virtual std::uint64_t Payload::getAbsoluteBCID ( ) const [pure virtual]`

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.2 getASICid()** `virtual std::uint32_t Payload::getASICid ( const std::uint32_t & ) const [pure virtual]`

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.3 getBCID()** virtual std::uint32\_t Payload::getBCID ( ) const [pure virtual]

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.4 getDetectorID()** std::uint32\_t Payload::getDetectorID ( ) const [inline]

Definition at line 29 of file [Payload.h](#).

```
00029 { return m_DetectorID; }
```

**4.14.3.5 getDIFid()** virtual std::uint32\_t Payload::getDIFid ( ) const [pure virtual]

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.6 getDTC()** virtual std::uint32\_t Payload::getDTC ( ) const [pure virtual]

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.7 getEndOfDIFData()** std::uint32\_t Payload::getEndOfDIFData ( ) const [inline]

Definition at line 45 of file [Payload.h](#).

```
00045 { return theGetFramePtrReturn_; }
```

**4.14.3.8 getFrameBCID()** virtual std::uint32\_t Payload::getFrameBCID ( const std::uint32\_t & ) const [pure virtual]

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.9 getFrameTimeToTrigger()** virtual std::uint32\_t Payload::getFrameTimeToTrigger ( const std::uint32\_t & ) const [pure virtual]

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.10 getGTC()** virtual std::uint32\_t Payload::getGTC ( ) const [pure virtual]

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.11 `getNumberOfFrames()`** `virtual std::uint32_t Payload::getNumberOfFrames ( ) const`  
[pure virtual]

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.12 `getSizeAfterDIFPtr()`** `std::uint32_t Payload::getSizeAfterDIFPtr ( ) const` [inline]

Definition at line 47 of file [Payload.h](#).

```
00047 { return size() - theGetFramePtrReturn_; }
```

**4.14.3.13 `getThresholdStatus()`** `virtual std::uint32_t Payload::getThresholdStatus (`  
`const std::uint32_t & ,`  
`const std::uint32_t & ) const` [pure virtual]

Implemented in [Payload100](#), and [Payload150](#).

**4.14.3.14 `parsePayload()`** `virtual void Payload::parsePayload ( )` [protected], [pure virtual]

**4.14.3.15 `setBuffer()`** `void Payload::setBuffer (`  
`const Buffer & buffer )` [inline]

Definition at line 39 of file [Payload.h](#).

```
00040 {  
00041     set(buffer);  
00042     parsePayload();  
00043 }
```

## 4.14.4 Member Data Documentation

**4.14.4.1 `m_DetectorID`** `std::int32_t Payload::m_DetectorID {-1}` [protected]

Definition at line 35 of file [Payload.h](#).

**4.14.4.2 `theGetFramePtrReturn_`** `std::uint32_t Payload::theGetFramePtrReturn_ {0}` [protected]

Definition at line 36 of file [Payload.h](#).

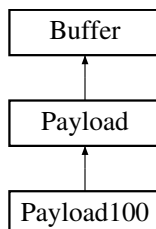
The documentation for this class was generated from the following file:

- [libs/core/include/Payload.h](#)

## 4.15 Payload100 Class Reference

```
#include <libs/core/include/Payload100.h>
```

Inheritance diagram for Payload100:



### Public Member Functions

- [Payload100](#) ()
- bool [hasTemperature](#) () const
- bool [hasAnalogReadout](#) () const
- virtual std::uint32\_t [getNumberOfFrames](#) () const final
- virtual std::uint32\_t [getThresholdStatus](#) (const std::uint32\_t &, const std::uint32\_t &) const final
- virtual std::uint32\_t [getDIFid](#) () const final
- virtual std::uint32\_t [getDTC](#) () const final
- virtual std::uint32\_t [getGTC](#) () const final
- virtual std::uint32\_t [getBCID](#) () const final
- virtual std::uint64\_t [getAbsoluteBCID](#) () const final
- virtual std::uint32\_t [getASICid](#) (const std::uint32\_t &) const final
- virtual std::uint32\_t [getFrameBCID](#) (const std::uint32\_t &) const final
- virtual std::uint32\_t [getFrameTimeToTrigger](#) (const std::uint32\_t &) const final
- virtual [~Payload100](#) ()

### Additional Inherited Members

#### 4.15.1 Detailed Description

Definition at line 27 of file [Payload100.h](#).

#### 4.15.2 Constructor & Destructor Documentation

##### 4.15.2.1 [Payload100\(\)](#) `Payload100::Payload100 ( )` [inline]

Definition at line 30 of file [Payload100.h](#).

```
00030 : Payload(100) {}
```

**4.15.2.2** `~Payload100()` `Payload100::~~Payload100 ( ) [virtual]`

Definition at line 193 of file [Payload100.cc](#).

```
00193 {}
```

## 4.15.3 Member Function Documentation

**4.15.3.1** `getAbsoluteBCID()` `std::uint64_t Payload100::getAbsoluteBCID ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 176 of file [Payload100.cc](#).

```
00177 {
00178     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
        Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER};
00179     std::uint64_t LBC = ((begin()[shift] << 16) | (begin()[shift + 1] << 8) | (begin()[shift + 2])) *
        16777216ULL + ((begin()[shift + 3] << 16) | (begin()[shift + 4] << 8) | (begin()[shift + 5]));
00180     return LBC;
00181 }
```

**4.15.3.2** `getASICid()` `std::uint32_t Payload100::getASICid (
 const std::uint32_t & i ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 183 of file [Payload100.cc](#).

```
00183 { return m_Frames[i][0] & 0xFF; }
```

**4.15.3.3** `getBCID()` `std::uint32_t Payload100::getBCID ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 170 of file [Payload100.cc](#).

```
00171 {
00172     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
        Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER + Size::ABSOLUTE_BCID};
00173     return (begin()[shift] << 16) + (begin()[shift + 1] << 8) + begin()[shift + 2];
00174 }
```

**4.15.3.4** `getDIFid()` `std::uint32_t Payload100::getDIFid ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 152 of file [Payload100.cc](#).

```
00153 {
00154     std::uint32_t shift{+Size::GLOBAL_HEADER};
00155     return begin()[shift] & 0xFF;
00156 }
```

**4.15.3.5 getDTC()** `std::uint32_t Payload100::getDTC ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 158 of file [Payload100.cc](#).

```
00159 {
00160     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF};
00161     return (begin()[shift] << 24) + (begin()[shift + 1] << 16) + (begin()[shift + 2] << 8) + begin()[shift
+ 3];
00162 }
```

**4.15.3.6 getFrameBCID()** `std::uint32_t Payload100::getFrameBCID (
const std::uint32_t & i ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 185 of file [Payload100.cc](#).

```
00186 {
00187     std::uint32_t shift{+Size::MICROROC_HEADER};
00188     return GrayToBin((m_Frames[i][shift] << 16) + (m_Frames[i][shift + 1] << 8) + m_Frames[i][shift + 2]);
00189 }
```

**4.15.3.7 getFrameTimeToTrigger()** `std::uint32_t Payload100::getFrameTimeToTrigger (
const std::uint32_t & i ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 191 of file [Payload100.cc](#).

```
00191 { return getBCID() - getFrameBCID(i); }
```

**4.15.3.8 getGTC()** `std::uint32_t Payload100::getGTC ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 164 of file [Payload100.cc](#).

```
00165 {
00166     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
Size::INFORMATION_COUNTER};
00167     return (begin()[shift] << 24) + (begin()[shift + 1] << 16) + (begin()[shift + 2] << 8) + begin()[shift
+ 3];
00168 }
```

**4.15.3.9 getNumberOfFrames()** `std::uint32_t Payload100::getNumberOfFrames ( ) const [inline],
[final], [virtual]`

Implements [Payload](#).

Definition at line 142 of file [Payload100.cc](#).

```
00142 { return m_Frames.size(); }
```

```

4.15.3.10 getThresholdStatus() std::uint32_t Payload100::getThresholdStatus (
    const std::uint32_t & i,
    const std::uint32_t & ipad ) const [inline], [final], [virtual]

```

Implements [Payload](#).

Definition at line 144 of file [Payload100.cc](#).

```

00144 { return ((std::uint32_t)getFrameLevel(i, ipad, 1)) | ((std::uint32_t)getFrameLevel(i, ipad, 0) <
1); }

```

```

4.15.3.11 hasAnalogReadout() bool Payload100::hasAnalogReadout ( ) const [inline]

```

Definition at line 114 of file [Payload100.cc](#).

```

00114 { return getNumberLines() != 0; }

```

```

4.15.3.12 hasTemperature() bool Payload100::hasTemperature ( ) const [inline]

```

Definition at line 112 of file [Payload100.cc](#).

```

00112 { return (static_cast<std::uint8_t>(begin()[0]) ==
static_cast<std::uint8_t>(Value::GLOBAL_HEADER_TEMP)); }

```

The documentation for this class was generated from the following files:

- [libs/core/include/Payload100.h](#)
- [libs/core/src/Payload100.cc](#)

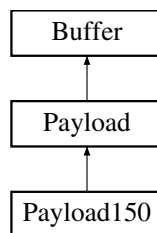
## 4.16 Payload150 Class Reference

```

#include <libs/core/include/Payload150.h>

```

Inheritance diagram for Payload150:



### Public Member Functions

- [Payload150](#) ()
- virtual std::uint32\_t [getNumberOfFrames](#) () const final
- virtual std::uint32\_t [getThresholdStatus](#) (const std::uint32\_t &, const std::uint32\_t &) const final
- virtual std::uint32\_t [getDIFid](#) () const final
- virtual std::uint32\_t [getDTC](#) () const final
- virtual std::uint32\_t [getGTC](#) () const final
- virtual std::uint32\_t [getBCID](#) () const final
- virtual std::uint64\_t [getAbsoluteBCID](#) () const final
- virtual std::uint32\_t [getASICid](#) (const std::uint32\_t &) const final
- virtual std::uint32\_t [getFrameBCID](#) (const std::uint32\_t &) const final
- virtual std::uint32\_t [getFrameTimeToTrigger](#) (const std::uint32\_t &) const final
- virtual [~Payload150](#) ()

## Additional Inherited Members

### 4.16.1 Detailed Description

Definition at line 10 of file [Payload150.h](#).

### 4.16.2 Constructor & Destructor Documentation

#### 4.16.2.1 Payload150() `Payload150::Payload150 ( ) [inline]`

Definition at line 13 of file [Payload150.h](#).

```
00013 : Payload(150) {}
```

#### 4.16.2.2 ~Payload150() `Payload150::~~Payload150 ( ) [virtual]`

Definition at line 136 of file [Payload150.cc](#).

```
00136 {}
```

### 4.16.3 Member Function Documentation

#### 4.16.3.1 getAbsoluteBCID() `std::uint64_t Payload150::getAbsoluteBCID ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 106 of file [Payload150.cc](#).

```
00107 {
00108     std::uint32_t shift{Size::GLOBAL_HEADER + Size::PMR_ID_SHIFT + Size::PMR_NBASIC_SHIFT +
        Size::PMR_FORMAT_SHIFT + Size::PMR_GTC_SHIFT};
00109     std::uint64_t LBC = ((begin()[shift] << 8) | (begin()[shift + 1])) * 16777216ULL + ((begin()[shift +
2] << 24) | (begin()[shift + 3] << 16) | (begin()[shift + 4] << 8) | begin()[shift + 5]);
00110     return LBC;
00111 }
```

#### 4.16.3.2 getASICid() `std::uint32_t Payload150::getASICid ( const std::uint32_t & i ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 126 of file [Payload150.cc](#).

```
00126 { return m_Frames[i][0] & 0xFF; }
```



**4.16.3.3 getBCID()** `std::uint32_t Payload150::getBCID ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 120 of file [Payload150.cc](#).

```
00121 {
00122     std::uint32_t shift{Size::GLOBAL_HEADER + Size::PMR_ID_SHIFT + Size::PMR_NBASIC_SHIFT +
        Size::PMR_FORMAT_SHIFT + Size::PMR_GTC_SHIFT + Size::PMR_ABCID_SHIFT};
00123     return (begin()[shift] << 16) + (begin()[shift + 1] << 8) + begin()[shift + 2];
00124 }
```

**4.16.3.4 getDIFid()** `std::uint32_t Payload150::getDIFid ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 94 of file [Payload150.cc](#).

```
00095 {
00096     std::uint32_t shift{+Size::GLOBAL_HEADER};
00097     return begin()[shift] & 0xFF;
00098 }
```

**4.16.3.5 getDTC()** `std::uint32_t Payload150::getDTC ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 113 of file [Payload150.cc](#).

```
00114 {
00115     // MAYBE NOR USEFUL
00116     std::uint32_t shift{};
00117     return (begin()[shift] << 24) + (begin()[shift + 1] << 16) + (begin()[shift + 2] << 8) + begin()[shift
        + 3];
00118 }
```

**4.16.3.6 getFrameBCID()** `std::uint32_t Payload150::getFrameBCID (
 const std::uint32_t & i ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 128 of file [Payload150.cc](#).

```
00129 {
00130     std::uint32_t shift{+Size::MICROROC_HEADER};
00131     return GrayToBin((m_Frames[i][shift] << 16) + (m_Frames[i][shift + 1] << 8) + m_Frames[i][shift + 2]);
00132 }
```

**4.16.3.7 getFrameTimeToTrigger()** `std::uint32_t Payload150::getFrameTimeToTrigger (
 const std::uint32_t & i ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 134 of file [Payload150.cc](#).

```
00134 { return getBCID() - getFrameBCID(i); }
```

**4.16.3.8 getGTC()** `std::uint32_t Payload150::getGTC ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 100 of file [Payload150.cc](#).

```
00101 {
00102     std::uint32_t shift{Size::GLOBAL_HEADER + Size::PMR_ID_SHIFT + Size::PMR_NBASIC_SHIFT +
        Size::PMR_FORMAT_SHIFT};
00103     return (begin()[shift] < 16) + (begin()[shift + 1] << 8) + begin()[shift + 2];
00104 }
```

**4.16.3.9 getNumberOfFrames()** `std::uint32_t Payload150::getNumberOfFrames ( ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 84 of file [Payload150.cc](#).

```
00084 { return m_Frames.size(); }
```

**4.16.3.10 getThresholdStatus()** `std::uint32_t Payload150::getThresholdStatus (
 const std::uint32_t & i,
 const std::uint32_t & ipad ) const [inline], [final], [virtual]`

Implements [Payload](#).

Definition at line 86 of file [Payload150.cc](#).

```
00086 { return (((std::uint32_t)getFrameLevel(i, ipad, 1))) | ((std::uint32_t)getFrameLevel(i, ipad, 0) <<
    1); }
```

The documentation for this class was generated from the following files:

- [libs/core/include/Payload150.h](#)
- [libs/core/src/Payload150.cc](#)

## 4.17 PayloadLoader Class Reference

```
#include <libs/core/include/PayloadLoader.h>
```

### Public Member Functions

- [PayloadLoader](#) ()=default
- `std::unique_ptr< Payload > & getPayload` (const std::int32\_t &detector\_id)

#### 4.17.1 Detailed Description

Definition at line 14 of file [PayloadLoader.h](#).

## 4.17.2 Constructor & Destructor Documentation

### 4.17.2.1 PayloadLoader() `PayloadLoader::PayloadLoader ( ) [default]`

## 4.17.3 Member Function Documentation

### 4.17.3.1 `getPayload() std::unique_ptr< Payload > & PayloadLoader::getPayload ( const std::int32_t & detector_id ) [inline]`

Definition at line 18 of file [PayloadLoader.h](#).

```
00019 {
00020     switch(detector_id)
00021     {
00022         case 100: payload = std::make_unique<Payload100>(); break;
00023         case 150: payload = std::make_unique<Payload150>(); break;
00024     }
00025     return payload;
00026 }
```

The documentation for this class was generated from the following file:

- [libs/core/include/PayloadLoader.h](#)

## 4.18 RawBufferNavigator Class Reference

class to navigate in the raw data buffer parse the header and send the payload as [Buffer](#)

```
#include <libs/core/include/RawBufferNavigator.h>
```

### Public Member Functions

- [RawBufferNavigator \(\)](#)
- [~RawBufferNavigator \(\)=default](#)
- void [setBuffer \(const Buffer &\)](#)
- `std::uint32_t` [getDetectorID \(\)](#)
- bool [findStartOfPayload \(\)](#)
- `std::int32_t` [getStartOfPayload \(\)](#)
- bool [validPayload \(\)](#)
- [Buffer](#) [getPayload \(\)](#)

### Static Public Member Functions

- static void [startAt \(const int &start\)](#)

### 4.18.1 Detailed Description

class to navigate in the raw data buffer parse the header and send the payload as [Buffer](#)

the [RawBufferNavigator](#) navigate in the raw data buffer and parse the header and send the payload as [Buffer](#).

The buffer structure consists of :

- the detector id (std::int32\_t)
- the datasource id (std::int32\_t)
- the event id (std::int32\_t)
- the bunch crossing id (std::int64\_t)
- the payload char array of (buffer size - 20) Based on

**Author**

Laurent Mirabito

**Version**

1.0

**Date**

May 2016

Definition at line 24 of file [RawBufferNavigator.h](#).

### 4.18.2 Constructor & Destructor Documentation

#### 4.18.2.1 RawBufferNavigator() `RawBufferNavigator::RawBufferNavigator ( )`

Definition at line 14 of file [RawBufferNavigator.cc](#).

```
00014 {}
```

#### 4.18.2.2 ~RawBufferNavigator() `RawBufferNavigator::~~RawBufferNavigator ( ) [default]`

### 4.18.3 Member Function Documentation

#### 4.18.3.1 findStartOfPayload() `bool RawBufferNavigator::findStartOfPayload ( )`

**4.18.3.2 getDetectorID()** `std::uint32_t RawBufferNavigator::getDetectorID ( )`Definition at line 18 of file [RawBufferNavigator.cc](#).

```
00018 { return m_Buffer[0]; }
```

**4.18.3.3 getPayload()** `Buffer RawBufferNavigator::getPayload ( )`Definition at line 22 of file [RawBufferNavigator.cc](#).

```
00022 { return Buffer(&(m_Buffer.begin()[m_StartPayload]), m_Buffer.size() - m_StartPayload); }
```

**4.18.3.4 getStartOfPayload()** `std::int32_t RawBufferNavigator::getStartOfPayload ( )`Definition at line 20 of file [RawBufferNavigator.cc](#).

```
00020 { return m_StartPayload; }
```

**4.18.3.5 setBuffer()** `void RawBufferNavigator::setBuffer ( const Buffer & b )`Definition at line 16 of file [RawBufferNavigator.cc](#).

```
00016 { m_Buffer = b; }
```

**4.18.3.6 startAt()** `void RawBufferNavigator::startAt ( const int & start ) [static]`Definition at line 9 of file [RawBufferNavigator.cc](#).

```
00010 {  
00011     if(start >= 0) m_StartPayload = start;  
00012 }
```

**4.18.3.7 validPayload()** `bool RawBufferNavigator::validPayload ( )`

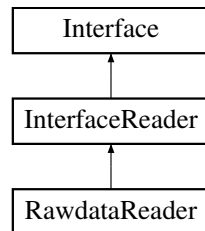
The documentation for this class was generated from the following files:

- [libs/core/include/RawBufferNavigator.h](#)
- [libs/core/src/RawBufferNavigator.cc](#)

## 4.19 RawdataReader Class Reference

```
#include <libs/interface/RawDataReader/include/RawdataReader.h>
```

Inheritance diagram for RawdataReader:



### Public Member Functions

- [RawdataReader](#) (const char \*fileName)
- void [start](#) (const [VersionInfos](#) &ver) final
- void [end](#) ()
- float [getFileSize](#) ()
- void [openFile](#) (const std::string &fileName)
- void [closeFile](#) ()
- bool [nextEvent](#) ()
- bool [nextDIFbuffer](#) ()
- const [Buffer](#) & [getBuffer](#) ()
- virtual [~RawdataReader](#) ()

### Static Public Member Functions

- static void [setDefaultBufferSize](#) (const std::size\_t &size)

### Additional Inherited Members

#### 4.19.1 Detailed Description

Definition at line 17 of file [RawdataReader.h](#).

#### 4.19.2 Constructor & Destructor Documentation

**4.19.2.1 RawdataReader()** `RawdataReader::RawdataReader (const char * fileName) [explicit]`

Definition at line 17 of file [RawdataReader.cc](#).

```

00017                                     : InterfaceReader("RawdataReader", "1.0.0")
00018 {
00019     m_buf.reserve(m_BufferSize);
00020     m_filename = fileName;
00021 }
  
```

**4.19.2.2** `~RawdataReader()` virtual RawdataReader::~~RawdataReader ( ) [inline], [virtual]

Definition at line 29 of file [RawdataReader.h](#).

```
00029 { closeFile(); }
```

### 4.19.3 Member Function Documentation

**4.19.3.1** `closeFile()` void RawdataReader::closeFile ( )

Definition at line 46 of file [RawdataReader.cc](#).

```
00047 {
00048     try
00049     {
00050         if(m_FileStream.is_open()) m_FileStream.close();
00051     }
00052     catch(const std::ios_base::failure& e)
00053     {
00054         log()->error("Caught an ios_base::failure in closeFile : {} {}", e.what(), e.code().value());
00055         throw;
00056     }
00057 }
```

**4.19.3.2** `end()` void RawdataReader::end ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 25 of file [RawdataReader.cc](#).

```
00025 { closeFile(); }
```

**4.19.3.3** `getBuffer()` const Buffer & RawdataReader::getBuffer ( )

Definition at line 121 of file [RawdataReader.cc](#).

```
00122 {
00123     uncompress();
00124     return m_Buffer;
00125 }
```

**4.19.3.4** `getFileSize()` float RawdataReader::getFileSize ( )

Definition at line 129 of file [RawdataReader.cc](#).

```
00129 { return m_FileSize; }
```

**4.19.3.5 nextDIFbuffer()** `bool RawdataReader::nextDIFbuffer ( )`Definition at line 94 of file [RawdataReader.cc](#).

```

00095 {
00096     try
00097     {
00098         static int DIF_processed{0};
00099         if(DIF_processed >= m_NumberOfDIF)
00100         {
00101             DIF_processed = 0;
00102             return false;
00103         }
00104         else
00105         {
00106             DIF_processed++;
00107             std::uint32_t bsize{0};
00108             m_FileStream.read(reinterpret_cast<char*>(&bsize), sizeof(std::uint32_t));
00109             m_FileStream.read(reinterpret_cast<char*>(&m_buf[0]), bsize);
00110             m_Buffer = Buffer(m_buf);
00111         }
00112     }
00113     catch(const std::ios_base::failure& e)
00114     {
00115         log()->error("Caught an ios_base::failure in openFile : {}", e.what());
00116         return false;
00117     }
00118     return true;
00119 }

```

**4.19.3.6 nextEvent()** `bool RawdataReader::nextEvent ( )`Definition at line 80 of file [RawdataReader.cc](#).

```

00081 {
00082     try
00083     {
00084         m_FileStream.read(reinterpret_cast<char*>(&m_EventNumber), sizeof(std::uint32_t));
00085         m_FileStream.read(reinterpret_cast<char*>(&m_NumberOfDIF), sizeof(std::uint32_t));
00086     }
00087     catch(const std::ios_base::failure& e)
00088     {
00089         return false;
00090     }
00091     return true;
00092 }

```

**4.19.3.7 openFile()** `void RawdataReader::openFile (`  
`const std::string & fileName )`Definition at line 59 of file [RawdataReader.cc](#).

```

00060 {
00061     try
00062     {
00063         m_FileStream.rdbuf()->pubsetbuf(0, 0);
00064         m_FileStream.exceptions(std::ifstream::failbit | std::ifstream::badbit);
00065         m_FileStream.open(fileName.c_str(), std::ios::in | std::ios::binary | std::ios::ate); // Start at
the end to directly calculate the size of the file then come back to beginning
00066         m_FileStream.rdbuf()->pubsetbuf(0, 0);
00067         if(m_FileStream.is_open())
00068         {
00069             setFileSize(m_FileStream.tellg());
00070             m_FileStream.seekg(0, std::ios::beg);
00071         }
00072     }
00073     catch(const std::ios_base::failure& e)
00074     {
00075         log()->error("Caught an ios_base::failure in openFile : {}", e.what());
00076         throw;
00077     }
00078 }

```



**4.19.3.8 setDefaultBufferSize()** void RawdataReader::setDefaultBufferSize ( const std::size\_t & size ) [static]

Definition at line 15 of file [RawdataReader.cc](#).

```
00015 { m_BufferSize = size; }
```

**4.19.3.9 start()** void RawdataReader::start ( const [VersionInfos](#) & ver ) [final], [virtual]

Reimplemented from [Interface](#).

Definition at line 23 of file [RawdataReader.cc](#).

```
00023 { openFile(m_Filename); }
```

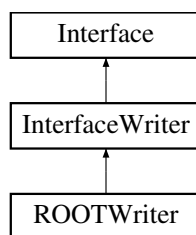
The documentation for this class was generated from the following files:

- [libs/interface/RawDataReader/include/RawdataReader.h](#)
- [libs/interface/RawDataReader/src/RawdataReader.cc](#)

## 4.20 ROOTWriter Class Reference

```
#include <libs/interface/ROOT/include/ROOTWriter.h>
```

Inheritance diagram for ROOTWriter:



### Public Member Functions

- [ROOTWriter](#) ()
- void [setFilename](#) (const std::string &)
- void [start](#) (const [VersionInfos](#) &ver)
- void [processDIF](#) (const [Payload](#) &)
- void [processFrame](#) (const [Payload](#) &, const std::uint32\_t &frameIndex)
- void [processPadInFrame](#) (const [Payload](#) &, const std::uint32\_t &frameIndex, const std::uint32\_t &channelIndex)
- void [processSlowControl](#) (const [Buffer](#) &)
- void [end](#) ()
- virtual void [startEvent](#) ()
- virtual void [endEvent](#) ()
- virtual void [startDIF](#) ()
- virtual void [endDIF](#) ()
- virtual void [startFrame](#) ()
- virtual void [endFrame](#) ()
- virtual void [startPad](#) ()
- virtual void [endPad](#) ()

## Additional Inherited Members

### 4.20.1 Detailed Description

Definition at line 17 of file [ROOTWriter.h](#).

### 4.20.2 Constructor & Destructor Documentation

#### 4.20.2.1 ROOTWriter() `ROOTWriter::ROOTWriter ( )`

Definition at line 10 of file [ROOTWriter.cc](#).

```
00010 : InterfaceWriter("ROOTWriter", "1.0.0") { addCompatibility("RawdataReader", ">=1.0.0"); }
```

### 4.20.3 Member Function Documentation

#### 4.20.3.1 `end()` `void ROOTWriter::end ( ) [virtual]`

Reimplemented from [Interface](#).

Definition at line 19 of file [ROOTWriter.cc](#).

```
00020 {  
00021     if(m_Tree) m_Tree->Write();  
00022     if(m_File)  
00023     {  
00024         m_File->Write();  
00025         m_File->Close();  
00026     }  
00027     if(m_File) delete m_File;  
00028 }
```

#### 4.20.3.2 `endDIF()` `void ROOTWriter::endDIF ( ) [virtual]`

Reimplemented from [Interface](#).

Definition at line 77 of file [ROOTWriter.cc](#).

```
00078 {  
00079     m_Event->addDIF(*m_DIF);  
00080     delete m_DIF;  
00081 }
```

#### 4.20.3.3 `endEvent()` `void ROOTWriter::endEvent ( ) [virtual]`

Reimplemented from [Interface](#).

Definition at line 65 of file [ROOTWriter.cc](#).

```
00066 {  
00067     m_Tree->Fill();  
00068     if(m_Event) delete m_Event;  
00069 }
```

**4.20.3.4 endFrame()** void ROOTWriter::endFrame ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 89 of file [ROOTWriter.cc](#).

```
00090 {
00091     m_DIF->addHit (*m_Hit);
00092     delete m_Hit;
00093 }
```

**4.20.3.5 endPad()** void ROOTWriter::endPad ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 97 of file [ROOTWriter.cc](#).

```
00097 {}
```

**4.20.3.6 processDIF()** void ROOTWriter::processDIF (
 const Payload & d )

Definition at line 30 of file [ROOTWriter.cc](#).

```
00031 {
00032     m_DIF->setDetectorID(d.getDetectorID());
00033     m_DIF->setID(d.getDIFid());
00034     m_DIF->setDTC(d.getDTC());
00035     m_DIF->setGTC(d.getGTC());
00036     m_DIF->setDIFBCID(d.getBCID());
00037     m_DIF->setAbsoluteBCID(d.getAbsoluteBCID());
00038 }
```

**4.20.3.7 processFrame()** void ROOTWriter::processFrame (
 const Payload & d,
 const std::uint32\_t & frameIndex )

Definition at line 40 of file [ROOTWriter.cc](#).

```
00041 {
00042     m_Hit->setDIF(d.getDIFid());
00043     m_Hit->setASIC(d.getASICid(frameIndex));
00044     m_Hit->setDTC(d.getDTC());
00045     m_Hit->setGTC(d.getGTC());
00046     m_Hit->setDIFBCID(d.getBCID());
00047     m_Hit->setAbsoluteBCID(d.getAbsoluteBCID());
00048     m_Hit->setFrameBCID(d.getFrameBCID(frameIndex));
00049     m_Hit->setTimestamp(d.getFrameTimeToTrigger(frameIndex));
00050 }
```

**4.20.3.8 processPadInFrame()** void ROOTWriter::processPadInFrame (
 const Payload & d,
 const std::uint32\_t & frameIndex,
 const std::uint32\_t & channelIndex )

Definition at line 52 of file [ROOTWriter.cc](#).

```
00053 {
00054     m_Hit->setChannel(channelIndex);
00055     m_Hit->setThreshold(static_cast<std::uint8_t>(d.getThresholdStatus(frameIndex, channelIndex)));
00056 }
```

**4.20.3.9 processSlowControl()** void ROOTWriter::processSlowControl ( const Buffer & ) [inline]

Definition at line 28 of file [ROOTWriter.h](#).

```
00028 { ; }
```

**4.20.3.10 setFilename()** void ROOTWriter::setFilename ( const std::string & filename )

Definition at line 8 of file [ROOTWriter.cc](#).

```
00008 { m_Filename = filename; }
```

**4.20.3.11 start()** void ROOTWriter::start ( const VersionInfos & ver ) [virtual]

Reimplemented from [Interface](#).

Definition at line 12 of file [ROOTWriter.cc](#).

```
00013 {
00014     m_File = TFile::Open(m_Filename.c_str(), "RECREATE", m_Filename.c_str(),
        ROOT::CompressionSettings(ROOT::kZLIB, 5));
00015     m_Tree = new TTree("RawData", "Raw SDHCAL data tree");
00016     m_Tree->Branch("Events", &m_Event, 512000, 99);
00017 }
```

**4.20.3.12 startDIF()** void ROOTWriter::startDIF ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 71 of file [ROOTWriter.cc](#).

```
00072 {
00073     m_DIF = new DIF();
00074     // m_DIF->clear();
00075 }
```

**4.20.3.13 startEvent()** void ROOTWriter::startEvent ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 58 of file [ROOTWriter.cc](#).

```
00059 {
00060     m_Event = new Event();
00061     m_Event->setEventNumber(getEventNumber());
00062     // m_Event->clear();
00063 }
```

**4.20.3.14 startFrame()** void ROOTWriter::startFrame ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 83 of file [ROOTWriter.cc](#).

```
00084 {  
00085     m_Hit = new Hit();  
00086     // m_Hit->clear();  
00087 }
```

**4.20.3.15 startPad()** void ROOTWriter::startPad ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 95 of file [ROOTWriter.cc](#).

```
00095 {}
```

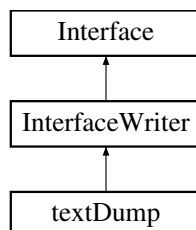
The documentation for this class was generated from the following files:

- [libs/interface/ROOT/include/ROOTWriter.h](#)
- [libs/interface/ROOT/src/ROOTWriter.cc](#)

## 4.21 textDump Class Reference

```
#include <libs/interface/Dump/include/textDump.h>
```

Inheritance diagram for textDump:



### Public Member Functions

- [textDump](#) ( )
- void [start](#) (const [VersionInfos](#) &ver) final
- void [processDIF](#) (const [Payload](#) &)
- void [processFrame](#) (const [Payload](#) &, uint32\_t frameIndex)
- void [processPadInFrame](#) (const [Payload](#) &, uint32\_t frameIndex, uint32\_t channelIndex)
- void [processSlowControl](#) ([Buffer](#))
- void [end](#) ( )
- std::shared\_ptr< spdlog::logger > & [print](#) ( )
- void [setLevel](#) (const spdlog::level::level\_enum &level)

## Additional Inherited Members

### 4.21.1 Detailed Description

Definition at line 14 of file [textDump.h](#).

### 4.21.2 Constructor & Destructor Documentation

#### 4.21.2.1 textDump() textDump::textDump ( )

Definition at line 7 of file [textDump.cc](#).

```
00007         :   InterfaceWriter("textDump", "1.0.0")
00008 {
00009     m_InternalLogger = std::make_shared<spdlog::logger>("textDump",
std::make_shared<spdlog::sinks::stdout_color_sink_mt>());
00010     m_InternalLogger->set_level(spdlog::level::trace);
00011     addCompatibility("RawdataReader", ">=1.0.0");
00012     addCompatibility("DIFdataExample", ">=1.0.0");
00013 }
```

### 4.21.3 Member Function Documentation

#### 4.21.3.1 end() void textDump::end ( ) [virtual]

Reimplemented from [Interface](#).

Definition at line 31 of file [textDump.cc](#).

```
00031 { print()->info("textDump end of report"); }
```

#### 4.21.3.2 print() std::shared\_ptr< spdlog::logger > & textDump::print ( ) [inline]

Definition at line 24 of file [textDump.h](#).

```
00024 { return m_InternalLogger; }
```

#### 4.21.3.3 processDIF() void textDump::processDIF ( const Payload & d )

Definition at line 17 of file [textDump.cc](#).

```
00017 { print()->info("DIF_ID : {}, DTC : {}, GTC : {}, DIF BCID {}, Absolute BCID : {}, Nbr frames {}",
d.getDIFid(), d.getDTC(), d.getGTC(), d.getBCID(), d.getAbsoluteBCID(), d.getNumberOfFrames()); }
```

**4.21.3.4 processFrame()** void textDump::processFrame (  
    const Payload & d,  
    uint32\_t frameIndex )

Definition at line 19 of file [textDump.cc](#).

```
00020 {  
00021     print()->info("\tDisplaying frame number {} : ASIC ID {}, Frame BCID {}, Frame Time To Trigger  
    (a.k.a timestamp) is {}", frameIndex, d.getASICid(frameIndex), d.getFrameBCID(frameIndex),  
    d.getFrameTimeToTrigger(frameIndex));  
00022 }
```

**4.21.3.5 processPadInFrame()** void textDump::processPadInFrame (  
    const Payload & d,  
    uint32\_t frameIndex,  
    uint32\_t channelIndex )

Definition at line 24 of file [textDump.cc](#).

```
00025 {  
00026     if(d.getThresholdStatus(frameIndex, channelIndex) > 0) { print()->info("\t\tChannel {}, Threshold  
    {}", channelIndex, d.getThresholdStatus(frameIndex, channelIndex)); }  
00027 }
```

**4.21.3.6 processSlowControl()** void textDump::processSlowControl (  
    Buffer )

Definition at line 29 of file [textDump.cc](#).

```
00029 { print()->error("textDump::processSlowControl not implemented yet."); }
```

**4.21.3.7 setLevel()** void textDump::setLevel (  
    const spdlog::level::level\_enum & level ) [inline]

Definition at line 25 of file [textDump.h](#).

```
00025 { m_InternalLogger->set_level(level); }
```

**4.21.3.8 start()** void textDump::start (  
    const VersionInfos & ver ) [final], [virtual]

Reimplemented from [Interface](#).

Definition at line 15 of file [textDump.cc](#).

```
00015 { print()->info("Will dump bunch of DIF data"); }
```

The documentation for this class was generated from the following files:

- [libs/interface/Dump/include/textDump.h](#)
- [libs/interface/Dump/src/textDump.cc](#)

## 4.22 Timer Class Reference

```
#include <libs/core/include/Timer.h>
```

### Public Member Functions

- void [start](#) ()
- void [stop](#) ()
- float [getElapsedTime](#) ()

#### 4.22.1 Detailed Description

Definition at line 9 of file [Timer.h](#).

#### 4.22.2 Member Function Documentation

##### 4.22.2.1 [getElapsedTime\(\)](#) float `Timer::getElapsedTime ( )` [inline]

Definition at line 14 of file [Timer.h](#).

```
00014 { return std::chrono::duration_cast<std::chrono::microseconds>(m_StopTime - m_StartTime).count(); }
```

##### 4.22.2.2 [start\(\)](#) void `Timer::start ( )` [inline]

Definition at line 12 of file [Timer.h](#).

```
00012 { m_StartTime = std::chrono::high_resolution_clock::now(); }
```

##### 4.22.2.3 [stop\(\)](#) void `Timer::stop ( )` [inline]

Definition at line 13 of file [Timer.h](#).

```
00013 { m_StopTime = std::chrono::high_resolution_clock::now(); }
```

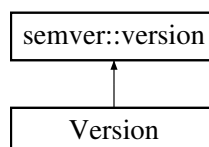
The documentation for this class was generated from the following file:

- [libs/core/include/Timer.h](#)

## 4.23 Version Class Reference

```
#include <libs/core/include/Version.h>
```

Inheritance diagram for Version:





## Public Member Functions

- [Version](#) (const std::uint8\_t &mj, const std::uint8\_t &mn, const std::uint8\_t &pt, const semver::prerelease &prt=semver::prerelease::none, const std::uint8\_t &prn=0) noexcept
- [Version](#) (const std::string\_view &str)
- [Version](#) ()=default
- std::uint8\_t [getMajor](#) ()
- std::uint8\_t [getMinor](#) ()
- std::uint8\_t [getPatch](#) ()
- std::string [getPreRelease](#) ()
- std::uint8\_t [getPreReleaseNumber](#) ()

### 4.23.1 Detailed Description

Definition at line 11 of file [Version.h](#).

### 4.23.2 Constructor & Destructor Documentation

**4.23.2.1 Version()** [1/3] `Version::Version (`  
    `const std::uint8_t & mj,`  
    `const std::uint8_t & mn,`  
    `const std::uint8_t & pt,`  
    `const semver::prerelease & prt = semver::prerelease::none,`  
    `const std::uint8_t & prn = 0 )` [inline], [noexcept]

Definition at line 14 of file [Version.h](#).

```
00014 : semver::version(mj, mn, pt, prt, prn) {}
```

**4.23.2.2 Version()** [2/3] `Version::Version (`  
    `const std::string_view & str )` [inline], [explicit]

Definition at line 15 of file [Version.h](#).

```
00015 : semver::version(str) {}
```

**4.23.2.3 Version()** [3/3] `Version::Version ( )` [default]

### 4.23.3 Member Function Documentation

#### 4.23.3.1 getMajor() `std::uint8_t Version::getMajor ( )`

Definition at line 9 of file [Version.cc](#).

```
00009 { return major; }
```

#### 4.23.3.2 getMinor() `std::uint8_t Version::getMinor ( )`

Definition at line 11 of file [Version.cc](#).

```
00011 { return minor; }
```

#### 4.23.3.3 getPatch() `std::uint8_t Version::getPatch ( )`

Definition at line 13 of file [Version.cc](#).

```
00013 { return patch; }
```

#### 4.23.3.4 getPreRelease() `std::string Version::getPreRelease ( )`

Definition at line 15 of file [Version.cc](#).

```
00016 {  
00017     switch(prerelease_type)  
00018     {  
00019         case semver::prerelease::alpha: return "alpha";  
00020         case semver::prerelease::beta:  return "beta";  
00021         case semver::prerelease::rc:    return "rc";  
00022         case semver::prerelease::none:  return "";  
00023         default: return "";  
00024     }  
00025 }
```

#### 4.23.3.5 getPreReleaseNumber() `std::uint8_t Version::getPreReleaseNumber ( )`

Definition at line 27 of file [Version.cc](#).

```
00027 { return prerelease_number; }
```

The documentation for this class was generated from the following files:

- [libs/core/include/Version.h](#)
- [libs/core/src/Version.cc](#)

## 4.24 VersionInfos Class Reference

```
#include <libs/core/include/VersionInfos.h>
```

## Public Member Functions

- void [setLibraryInfos](#) (const std::string &name, const [Version](#) &version)
- void [setReaderInfos](#) (const std::string &name, const [Version](#) &version)
- void [setWriterInfos](#) (const std::string &name, const [Version](#) &version)
- std::pair< std::string, [Version](#) > [getLibraryInfos](#) () const
- std::pair< std::string, [Version](#) > [getReaderInfos](#) () const
- std::pair< std::string, [Version](#) > [getWriterInfos](#) () const

### 4.24.1 Detailed Description

Definition at line 12 of file [VersionInfos.h](#).

### 4.24.2 Member Function Documentation

**4.24.2.1 [getLibraryInfos\(\)](#)** std::pair< std::string, [Version](#) > VersionInfos::getLibraryInfos ( )  
const [inline]

Definition at line 18 of file [VersionInfos.h](#).

```
00018 { return m_StreamoutLibraryInfos; }
```

**4.24.2.2 [getReaderInfos\(\)](#)** std::pair< std::string, [Version](#) > VersionInfos::getReaderInfos ( )  
const [inline]

Definition at line 19 of file [VersionInfos.h](#).

```
00019 { return m_ReaderInfos; }
```

**4.24.2.3 [getWriterInfos\(\)](#)** std::pair< std::string, [Version](#) > VersionInfos::getWriterInfos ( )  
const [inline]

Definition at line 20 of file [VersionInfos.h](#).

```
00020 { return m_WriterInfos; }
```

**4.24.2.4 [setLibraryInfos\(\)](#)** void VersionInfos::setLibraryInfos (   
const std::string & name,   
const [Version](#) & version ) [inline]

Definition at line 15 of file [VersionInfos.h](#).

```
00015 { m_StreamoutLibraryInfos = std::pair<std::string, Version>(name, version); }
```

**4.24.2.5 setReaderInfos()** void VersionInfos::setReaderInfos (   
 const std::string & name,   
 const [Version](#) & version ) [inline]

Definition at line 16 of file [VersionInfos.h](#).

```
00016 { m_ReaderInfos = std::pair<std::string, Version>(name, version); }
```

**4.24.2.6 setWriterInfos()** void VersionInfos::setWriterInfos (   
 const std::string & name,   
 const [Version](#) & version ) [inline]

Definition at line 17 of file [VersionInfos.h](#).

```
00017 { m_WriterInfos = std::pair<std::string, Version>(name, version); }
```

The documentation for this class was generated from the following file:

- [libs/core/include/VersionInfos.h](#)

## 5 File Documentation

### 5.1 [libs/core/include/Bits.h](#) File Reference

```
#include <cstdint>  
#include <iosfwd>
```

#### Typedefs

- using [bit8\\_t](#) = std::uint8\_t
- using [bit16\\_t](#) = std::uint16\_t
- using [bit32\\_t](#) = std::uint32\_t
- using [bit64\\_t](#) = std::uint64\_t

#### Functions

- std::ostream & [operator<<](#) (std::ostream &os, const [bit8\\_t](#) &c)   
 *Stream operator to print [bit8\\_t](#) aka std::uint8\_t and not char or unsigned char.*

#### 5.1.1 Detailed Description

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Definition in file [Bits.h](#).

## 5.1.2 Typedef Documentation

### 5.1.2.1 `bit16_t` using `bit16_t` = `std::uint16_t`

Definition at line 11 of file [Bits.h](#).

### 5.1.2.2 `bit32_t` using `bit32_t` = `std::uint32_t`

Definition at line 12 of file [Bits.h](#).

### 5.1.2.3 `bit64_t` using `bit64_t` = `std::uint64_t`

Definition at line 13 of file [Bits.h](#).

### 5.1.2.4 `bit8_t` using `bit8_t` = `std::uint8_t`

Definition at line 10 of file [Bits.h](#).

## 5.1.3 Function Documentation

### 5.1.3.1 `operator<<()` `std::ostream & operator<< (` `std::ostream & os,` `const bit8_t & c )`

Stream operator to print `bit8_t` aka `std::uint8_t` and not char or unsigned char.

Definition at line 8 of file [Bits.cc](#).

```
00008 { return os << c + 0; }
```

## 5.2 Bits.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include <cstdint>
00008 #include <iosfwd>
00009
00010 using bit8_t = std::uint8_t; /*<! type to represent 8bits words (1 byte) */
00011 using bit16_t = std::uint16_t; /*<! type to represent 16bits words (2 bytes) */
00012 using bit32_t = std::uint32_t; /*<! type to represent 32bits words (4 bytes) */
00013 using bit64_t = std::uint64_t; /*<! type to represent 64bits words (8 bytes) */
00014
00016 std::ostream& operator<<(std::ostream& os, const bit8_t& c);
```

## 5.3 libs/core/include/Buffer.h File Reference

```
#include "Bits.h"
#include <array>
#include <string>
#include <vector>
```

### Classes

- class [Buffer](#)

### 5.3.1 Detailed Description

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#### See also

<https://github.com/apingault/Trivent4HEP>

Definition in file [Buffer.h](#).

## 5.4 Buffer.h

Go to the documentation of this file.

```
00001
00006 #pragma once
00007
00008 #include "Bits.h"
00009
00010 #include <array>
00011 #include <string>
00012 #include <vector>
00013
00014 class Buffer
00015 {
00016 public:
00017     Buffer() : m_Buffer(nullptr), m_Size(0), m_Capacity(0) {}
00018     virtual ~Buffer() {}
00019     Buffer(const bit8_t b[], const std::size_t& i) : m_Buffer(const_cast<bit8_t*>(&b[0])), m_Size(i),
m_Capacity(i) {}
00020     Buffer(const char b[], const std::size_t& i) : m_Buffer(const_cast<bit8_t*>(reinterpret_cast<const
bit8_t*>(&b[0])), m_Size(i * sizeof(char)), m_Capacity(i * sizeof(char)) {}
00021     template<typename T> Buffer(const std::vector<T>& rawdata) :
m_Buffer(const_cast<bit8_t*>(reinterpret_cast<const bit8_t*>(rawdata.data()))), m_Size(rawdata.size()
* sizeof(T)), m_Capacity(rawdata.capacity() * sizeof(T)) {}
00022     template<typename T, std::size_t N> Buffer(const std::array<T, N>& rawdata) :
m_Buffer(const_cast<bit8_t*>(reinterpret_cast<const bit8_t*>(rawdata.data()))), m_Size(rawdata.size()
* sizeof(T)), m_Capacity(rawdata.size() * sizeof(T)) {}
00023
00024     std::size_t size()const { return m_Size; }
00025     std::size_t capacity()const { return m_Capacity; }
00026
00027     bool empty() { return m_Size == 0; }
00028     void set(unsigned char* b) { m_Buffer = b; }
00029     void set(const Buffer& buffer)
00030     {
00031         m_Buffer = buffer.begin();
00032         m_Size = buffer.size();
00033         m_Capacity = buffer.capacity();
00034     }
00035     bit8_t* begin()const { return m_Buffer; }
00036     bit8_t* end()const { return m_Buffer + m_Size; }
```

```
00037 bit8_t& operator[](const std::size_t& pos) { return m_Buffer[pos]; }
00038 bit8_t& operator[](const std::size_t& pos) const { return m_Buffer[pos]; }
00039
00040 void setSize(const std::size_t& size) { m_Size = size; }
00041
00042 private:
00043     bit8_t* m_Buffer{nullptr};
00044     std::size_t m_Size{0};
00045     std::size_t m_Capacity{0};
00046 };
```

## 5.5 libs/core/include/BufferLooper.h File Reference

```
#include "AppVersion.h"
#include "BufferLooperCounter.h"
#include "DetectorId.h"
#include "Formatters.h"
#include "PayloadLoader.h"
#include "RawBufferNavigator.h"
#include "Timer.h"
#include "VersionInfos.h"
#include "Words.h"
#include <algorithm>
#include <cassert>
#include <fmt/color.h>
#include <map>
#include <memory>
#include <spdlog/sinks/null_sink.h>
#include <spdlog/spdlog.h>
#include <string>
#include <vector>
```

### Classes

- class [BufferLooper](#)< SOURCE, DESTINATION >

### 5.5.1 Detailed Description

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Definition in file [BufferLooper.h](#).

## 5.6 BufferLooper.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include "AppVersion.h"
00008 #include "BufferLooperCounter.h"
00009 #include "DetectorId.h"
00010 #include "Formatters.h"
00011 #include "PayloadLoader.h"
00012 #include "RawBufferNavigator.h"
00013 #include "Timer.h"
```

```

00014 #include "VersionInfos.h"
00015 #include "Words.h"
00016
00017 #include <algorithm>
00018 #include <cassert>
00019 #include <fmt/color.h>
00020 #include <map>
00021 #include <memory>
00022 #include <spdlog/sinks/null_sink.h>
00023 #include <spdlog/spdlog.h>
00024 #include <string>
00025 #include <vector>
00026 // function to loop on buffers
00027
00028 template<typename SOURCE, typename DESTINATION> class BufferLooper
00029 {
00030 public:
00031     BufferLooper(SOURCE& source, DESTINATION& dest, bool debug = false) : m_Source(source),
m_Destination(dest), m_Debug(debug)
00032     {
00033         m_Logger = spdlog::create<spdlog::sinks::null_sink_mt>("streamout");
00034         if(!spdlog::get("streamout")) { spdlog::register_logger(m_Logger); }
00035         m_Source.setLogger(m_Logger);
00036         m_Destination.setLogger(m_Logger);
00037     }
00038
00039     void addSink(const spdlog::sink_ptr& sink, const spdlog::level::level_enum& level =
spdlog::get_level())
00040     {
00041         sink->set_level(level);
00042         m_Sinks.push_back(sink);
00043         m_Logger = std::make_shared<spdlog::logger>("streamout", begin(m_Sinks), end(m_Sinks));
00044         m_Source.setLogger(m_Logger);
00045         m_Destination.setLogger(m_Logger);
00046     }
00047
00048     void loop(const std::uint32_t& m_NbrEventsToProcess = 0)
00049     {
00050         // clang-format off
00051         fmt::print(fmt::color::medium_orchid | fmt::emphasis::bold,
00052                 "\n"
00053                 " SSSSSSSSSSSSSSS      tttt
00054                 tttt\n"
00055                 "SS::::::::::::::::::S ttt::t
00056                 ttt::t\n"
00057                 "S::::SSSSS:::::S t::::t
00058                 t::::t\n"
00059                 "S::::S      SSSSSS t::::t
00060                 t::::t\n"
00061                 "S::::S      tttttt:::::tttttt rrrrr rrrrrrrrrr      eeeeeeeeeee aaaaaaaaaaaaa
00062                 mmmmmmmmm      mmmmmmmmm      oooooooooo      uuuuuu      uuuuuutttttt:::::tttttt\n"
00063                 "S::::S      t:::::t      r::::rrr:::::r      ee:::::ee a:::::a
00064                 mm:::::m m:::::mm oo:::::oo u::::u      u::::ut:::::t\n"
00065                 " S::::SSSS t:::::t      r:::::r      e:::::eeeeee:::::eaaaaaaaaa:::::a
00066                 m:::::mm:::::mo:::::mo:::::ou::::u      u::::ut:::::t\n"
00067                 " SS:::::SSSSStttttt:::::ttttt rr:::::rrrrr:::::re:::::e e:::::e      a:::::a
00068                 m:::::mo:::::o      o::::ou::::u      u::::utttttt:::::ttttt\n"
00069                 " SSS:::::SS t::::t      r::::r      r::::re:::::e eeeee:::::e aaaaaa:::::a
00070                 m::::m m::::mo::::o      o::::ou::::u      u::::u      t::::t\n"
00071                 " SSSSSS::::S t::::t      r::::r      rrrrrre:::::e aa:::::a m::::m
00072                 m::::m m::::mo::::o      o::::ou::::u      u::::u      t::::t\n"
00073                 " S::::S t::::t      tttttt:::::r      e:::::e      a::::a      a::::a m::::m
00074                 m::::m m::::mo::::o      o::::ou::::uuuu::::u      t::::t      tttttt\n"
00075                 "SSSSSSS S::::S t:::::ttt:::::tr::::r      e:::::e      a::::a      a::::a m::::m
00076                 m::::m m::::mo::::o      ooooo::::ou:::::uu      t:::::ttt:::::t\n"
00077                 "S:::::SSSSS::::S tt:::::tr::::r      e:::::eeeeeeea:::::aaaa:::::a m::::m
00078                 m::::m m::::mo:::::o u:::::u      tt:::::t\n"
00079                 "S:::::SS      tt:::::tr::::r      ee:::::e a:::::aa:::am::::m
00080                 m::::m m::::oo:::::oo uu:::::uu      tt:::::tt\n"
00081                 " SSSSSSSSSSSSS      tttttttttt rrrrrrr      eeeeeeeeeee aaaaaaaaa aaaaammmmmm
00082                 mmmmmmm mmmmmmm oooooooooo      uuuuuuuu      uuuu      tttttttttt {} \n"
00083                 "\n",
00084                 fmt::format(fmt::color::red | fmt::emphasis::bold, "v{}", streamout_version.to_string());
00085                 // clang-format on
00086                 log()->info("*****");
00087                 log()->info("Streamout Version : {}", streamout_version.to_string());
00088                 log()->info("Using InterfaceReader {} version {}", m_Source.getName(),
m_Source.getVersion().to_string());
00089                 log()->info("Using InterfaceWriter {} version {}", m_Destination.getName(),
m_Destination.getVersion().to_string());
00090
00091         VersionInfos version;
00092         version.setLibraryInfos("streamout", streamout_version);
00093         version.setReaderInfos(m_Source.getName(), m_Source.getVersion());
00094         version.setWriterInfos(m_Destination.getName(), m_Destination.getVersion());

```



```

00081
00082     if(!m_Destination.checkCompatibility(m_Source.getName(), m_Source.getVersion().to_string()))
00083     {
00084         log()->critical("{} version {} is not compatible with {} version {} ! ", m_Source.getName(),
m_Source.getVersion().to_string(), m_Destination.getName(), m_Destination.getVersion().to_string());
00085         log()->info("Compatible Interfaces for {} are", m_Destination.getName());
00086         for(std::map<std::string, std::string>::iterator it = m_Destination.getCompatibility().begin();
it != m_Destination.getCompatibility().end(); ++it) { log()->info("{} version {}", it->first,
it->second); }
00087         std::exit(-1);
00088     }
00089     if(!m_DetectorIDs.empty())
00090     {
00091         std::string ids;
00092         for(std::vector<DetectorID>::const_iterator it = m_DetectorIDs.cbegin(); it !=
m_DetectorIDs.cend(); ++it) ids += std::to_string(static_cast<std::uint16_t>(*it)) + ";";
00093         log()->info("Detector ID(s) other than {} will be ignored", ids);
00094     }
00095     log()->info("*****");
00096     RawBufferNavigator bufferNavigator;
00097     Timer timer;
00098     timer.start();
00099     m_Source.start(version);
00100     m_Destination.start(version);
00101     while(m_Source.nextEvent() && m_NbrEventsToProcess >= m_NbrEvents)
00102     {
00103         m_Destination.setEventNumber(m_Source.getEventNumber());
00104         /*****/
00105         /**** START EVENT ****/
00106         m_Source.startEvent();
00107         m_Destination.startEvent();
00108         /*****/
00109
00110         m_Logger->warn("==== Event {} =====", m_NbrEvents);
00111         while(m_Source.nextDIFbuffer())
00112         {
00113             const Buffer& buffer = m_Source.getBuffer();
00114
00115             bufferNavigator.setBuffer(buffer);
00116             if(std::find(m_DetectorIDs.begin(), m_DetectorIDs.end(),
static_cast<DetectorID>(bufferNavigator.getDetectorID())) == m_DetectorIDs.end())
00117             {
00118                 m_Logger->debug("Ignoring detector ID : {}", bufferNavigator.getDetectorID());
00119                 continue;
00120             }
00121
00122             std::int32_t idstart = bufferNavigator.getStartOfPayload();
00123             if(m_Debug && idstart == -1) m_Logger->info(to_hex(buffer));
00124             c.DIFStarter[idstart]++;
00125
00126         /*****/
00127         /**** START DIF ****/
00128         m_Source.startDIF();
00129         m_Destination.startDIF();
00130         /*****/
00131
00132         PayloadLoader payloadLoader;
00133
00134         std::unique_ptr<Payload>& d = payloadLoader.getPayload(bufferNavigator.getDetectorID());
00135         if(d == nullptr)
00136         {
00137             m_Logger->error("streamout don't know how to parse the payload for detector_id {} !
SKIPPING !", bufferNavigator.getDetectorID());
00138             continue;
00139         }
00140
00141         // This is really a big error so skip DIF entirely if exception occurs
00142         try
00143         {
00144             d->setBuffer(bufferNavigator.getPayload());
00145             m_Logger->info("Parsing payload DIF_ID {} (detector_id {})", d->getDIFid(),
bufferNavigator.getDetectorID());
00146         }
00147         catch(const Exception& e)
00148         {
00149             m_Logger->error("{} ", e.what());
00150             continue;
00151         }
00152
00153         if(buffer.end() != d->end()) m_Logger->error("DIF BUFFER END {} {}", fmt::ptr(buffer.end()),
fmt::ptr(d->end()));
00154         assert(buffer.end() == d->end());
00155
00156         c.DIFPtrValueAtReturnedPos[d->begin() [d->getEndOfDIFData() - 3]]++;
00157         assert(d->begin() [d->getEndOfDIFData() - 3] == 0xa0);
00158
00159         c.SizeAfterDIFPtr[d->getSizeAfterDIFPtr()]++;

```

```

00160     m_Destination.processDIF(*d);
00161     for(std::size_t i = 0; i < d->getNumberOfFrames(); ++i)
00162     {
00163         //
00164         m_Source.startFrame();
00165         m_Destination.startFrame();
00166         //
00167         m_Destination.processFrame(*d, i);
00168         for(std::size_t j = 0; j < static_cast<std::size_t>(Hardware::NUMBER_PAD); ++j)
00169         {
00170             if(d->getThresholdStatus(i, j) != 0)
00171             {
00172                 m_Source.startPad();
00173                 m_Destination.startPad();
00174                 m_Destination.processPadInFrame(*d, i, j);
00175                 m_Source.endPad();
00176                 m_Destination.endPad();
00177             }
00178         }
00179         //
00180         m_Source.endFrame();
00181         m_Destination.endFrame();
00182         //
00183     }
00184     // If I want SlowControl I need to check for it first, If there is an error then it's not a
    big deal just continue and say is bad SlowControl
00185     /*try
00186     {
00187     d.setSCBuffer();
00188     }
00189     catch(const Exception& e)
00190     {
00191     m_Logger->error("{} ", e.what());
00192     }
00193     */
00194     bool processSC = false;
00195     if(d.hasSlowControl())
00196     {
00197         c.hasSlowControl++;
00198         processSC = true;
00199     }
00200     if(d.badSCData())
00201     {
00202         c.hasBadSlowControl++;
00203         processSC = false;
00204     }
00205     if(processSC) { m_Destination.processSlowControl(d.getSCBuffer()); } */
00206
00207     // Buffer eod = d.getEndOfAllData();
00208     // c.SizeAfterAllData[eod.size()]++;
00209     // bit8_t* debug_variable_3 = eod.end();
00210     // if(buffer.end() != debug_variable_3) m_Logger->info("END DATA BUFFER END {} {} ",
    fmt::ptr(buffer.end()), fmt::ptr(debug_variable_3));
00211     // assert(buffer.end() == debug_variable_3);
00212     // if(eod.size() != 0) m_Logger->info("End of Data remaining stuff : {}", to_hex(eod)); */
00213
00214     /*int nonzeroCount = 0;
00215     for(bit8_t* it = eod.begin(); it != eod.end(); it++)
00216     if(static_cast<int>(*it) != 0) nonzeroCount++;
00217     c.NonZeroValusAtEndOfData[nonzeroCount]++; */
00218
00219     //
00220     //
00221     m_Source.endDIF();
00222     m_Destination.endDIF();
00223     //
00224     } // end of DIF while loop
00225     m_Logger->warn("====* Event {} *====", m_NbrEvents);
00226     m_NbrEvents++;
00227     /******
00228     /*** END EVENT ***/
00229     m_Source.endEvent();
00230     m_Destination.endEvent();
00231     /******
00232     } // end of event while loop
00233     m_Destination.end();
00234     m_Source.end();
00235     timer.stop();
00236     fmt::print(fg(fmt::color::green) | fmt::emphasis::bold, "=== elapsed time {}ms ({}ms/event)
    ===\n", timer.getElapsedTime() / 1000, timer.getElapsedTime() / (1000 * m_NbrEvents));
00237     }
00238     void printAllCounters() { c.printAllCounters(); }
00239     std::shared_ptr<spdlog::logger> log() { return m_Logger; }
00240
00241     void setDetectorIDs(const std::vector<DetectorID>& detectorIDs) { m_DetectorIDs = detectorIDs; }
00242
00243 private:

```

```

00244     std::vector<DetectorID>           m_DetectorIDs;
00245     std::shared_ptr<spdlog::logger> m_Logger{nullptr};
00246     std::vector<spdlog::sink_ptr>    m_Sinks;
00247     BufferLooperCounter               c;
00248     SOURCE&                          m_Source{nullptr};
00249     DESTINATION&                     m_Destination{nullptr};
00250     bool                              m_Debug{false};
00251     std::uint32_t                    m_NbrEvents{1};
00252 };

```

## 5.7 libs/core/include/BufferLooperCounter.h File Reference

```

#include <ios>
#include <map>
#include <memory>
#include <string>

```

### Classes

- struct [BufferLooperCounter](#)

### 5.7.1 Detailed Description

#### Copyright

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Definition in file [BufferLooperCounter.h](#).

## 5.8 BufferLooperCounter.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006
00007 #include <ios>
00008 #include <map>
00009 #include <memory>
00010 #include <string>
00011
00012 struct BufferLooperCounter
00013 {
00014 public:
00015     int             hasSlowControl      = 0;
00016     int             hasBadSlowControl   = 0;
00017     std::map<int, int> DIFStarter;
00018     std::map<int, int> DIFPtrValueAtReturnedPos;
00019     std::map<int, int> SizeAfterDIFPtr;
00020     std::map<int, int> SizeAfterAllData;
00021     std::map<int, int> NonZeroValusAtEndOfData;
00022
00023     void printCounter(const std::string& description, const std::map<int, int>& m, const
std::ios_base::fmtflags& base = std::ios_base::dec);
00024     void printAllCounters();
00025 };

```

## 5.9 libs/core/include/DetectorId.h File Reference

```

#include <cstdint>

```

## Enumerations

- enum class [DetectorID](#) : std::uint16\_t { [HARDROC](#) = 100 , [HARDROC\\_NEW](#) = 150 , [RUNHEADER](#) = 255 }

### 5.9.1 Detailed Description

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Definition in file [DetectorId.h](#).

### 5.9.2 Enumeration Type Documentation

#### 5.9.2.1 [DetectorID](#) enum class [DetectorID](#) : std::uint16\_t [strong]

##### Enumerator

<a href="#">HARDROC</a>	
<a href="#">HARDROC_NEW</a>	
<a href="#">RUNHEADER</a>	

Definition at line 9 of file [DetectorId.h](#).

```
00010 {
00011     HARDROC      = 100,
00012     HARDROC\_NEW  = 150,
00013     RUNHEADER    = 255
00014 };
```

## 5.10 DetectorId.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include <cstdint>
00008
00009 enum class DetectorID : std::uint16_t
00010 {
00011     HARDROC      = 100,
00012     HARDROC\_NEW  = 150,
00013     RUNHEADER    = 255
00014 };
```

## 5.11 libs/core/include/DIFSlowControl.h File Reference

```
#include <bitset>
#include <cstdint>
#include <iosfwd>
#include <map>
#include <string>
```

## Classes

- class [DIFSlowControl](#)

## Functions

- `std::string to_string` (const [DIFSlowControl](#) &c)

### 5.11.1 Detailed Description

#### Copyright

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Definition in file [DIFSlowControl.h](#).

### 5.11.2 Function Documentation

#### 5.11.2.1 `to_string()` `std::string to_string (` `const DIFSlowControl & c )`

Definition at line 256 of file [DIFSlowControl.cc](#).

```
00257 {
00258     std::string ret;
00259     for(std::map<int, std::map<std::string, int>::const_iterator it = c.cbegin(); it != c.cend(); it++)
00260     {
00261         ret += "ASIC " + std::to_string(it->first) + " :\n";
00262         for(std::map<std::string, int>::const_iterator jt = (it->second).begin(); jt !=
(it->second).end(); jt++) ret += jt->first + " : " + std::to_string(jt->second) + "\n";
00263     }
00264     return ret;
00265 }
```

## 5.12 DIFSlowControl.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include <bitset>
00008 #include <cstdint>
00009 #include <iosfwd>
00010 #include <map>
00011 #include <string>
00012
00013 class DIFSlowControl
00014 {
00015 public:
00017
00022     DIFSlowControl(const std::uint8_t& version, const std::uint8_t& DIFid, unsigned char* buf);
00023
00025     std::uint8_t getDIFid();
00026
00028
00031     std::map<int, std::map<std::string, int> getChipsMap();
00032
00034
00038     std::map<std::string, int> getChipSlowControl(const int& asicid);
00039
00041
```

```

00045 int getChipSlowControl(const std::int8_t& asicid, const std::string& param);
00046
00047 std::map<int, std::map<std::string, int>::const_iterator cbegin()const { return m_MapSC.cbegin(); }
00048
00049 std::map<int, std::map<std::string, int>::const_iterator cend()const { return m_MapSC.cend(); }
00050
00051 private:
00052 DIFSlowControl() = delete;
00053 void FillHR1(const int& header_shift, unsigned char* cbuf);
00054 void FillHR2(const int& header_shift, unsigned char* cbuf);
00055 void FillAsicHR1(const std::bitset<72 * 8>& bs);
00056 void FillAsicHR2(const std::bitset<109 * 8>& bs);
00057
00058 unsigned int m_DIFId{0};
00059 unsigned int m_Version{0};
00060 unsigned int m_AsicType{0}; // asicType_
00061 unsigned int m_NbrAsic{0};
00062 std::map<int, std::map<std::string, int> m_MapSC;
00063 };
00064
00065 std::string to_string(const DIFSlowControl& c);
00066 /* void setSCBuffer()
00067 {
00068 if(!hasSlowControl()) return;
00069 if(m_SCbuffer.size() != 0) return; // deja fait
00070 if(m_BadSlowControl) return;
00071 m_SCbuffer.set(&(amp;begin()[getEndOfDIFData()]));
00072 // compute Slow Control size
00073 std::size_t maxsize{size() - getEndOfDIFData() + 1}; // should I +1 here ?
00074 uint32_t k{1}; // SC Header
00075 uint32_t dif_ID{m_SCbuffer[1]};
00076 uint32_t chipSize{m_SCbuffer[3]};
00077 while((dif_ID != 0xal && m_SCbuffer[k] != 0xal && k < maxsize) || (dif_ID == 0xal && m_SCbuffer[k + 2]
== chipSize && k < maxsize))
00078 {
00079 k += 2; // DIF ID + ASIC Header
00080 uint32_t scsize = m_SCbuffer[k];
00081 if(scsize != 74 && scsize != 109)
00082 {
00083 k = 0;
00084 m_BadSlowControl = true;
00085 throw Exception(fmt::format("PROBLEM WITH SC SIZE {} ", scsize));
00086 }
00087 k++; // skip size bit
00088 k += scsize; // skip the data
00089 }
00090 if(m_SCbuffer[k] == 0xal && !m_BadSlowControl) m_SCbuffer.setSize(k + 1); // add the trailer
00091 else
00092 {
00093 m_BadSlowControl = true;
00094 throw Exception(fmt::format("PROBLEM SC TRAILER NOT FOUND "));
00095 }
00096 }*/

```

## 5.13 libs/core/include/Exception.h File Reference

```

#include <stdint>
#include <exception>
#include <string>

```

### Classes

- class [Exception](#)

### 5.13.1 Detailed Description

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Definition in file [Exception.h](#).

## 5.14 Exception.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include <cstdlib>
00008 #include <exception>
00009 #include <string>
00010
00011 class Exception
00012 {
00013 public:
00014     virtual const char* what() const noexcept { return m_What.c_str(); }
00015     explicit Exception(const std::string& message) : m_Message(message) { constructWhat(); }
00016     Exception(const std::int32_t& error, const std::string& message) : m_Error(error),
m_Message(message) { constructWhat(); }
00017     std::int32_t error() { return m_Error; }
00018     std::string message() { return m_Message; }
00019
00020 private:
00021     void constructWhat()
00022     {
00023         if(m_Error == 0) m_What = m_Message;
00024         else
00025             m_What = std::string("Error ") + std::to_string(m_Error) + std::string(" : ") + m_Message;
00026     }
00027     std::string m_What;
00028     std::string m_Message;
00029     std::int32_t m_Error{0};
00030 };
```

## 5.15 libs/core/include/Filesystem.h File Reference

```
#include <string>
```

### Functions

- `std::string path` (const `std::string &`)
- `std::string extension` (const `std::string &`)
- `std::string filename` (const `std::string &`)

### 5.15.1 Detailed Description

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Definition in file [Filesystem.h](#).

### 5.15.2 Function Documentation

**5.15.2.1 extension()** `std::string extension (`  
`const std::string & file )`

Definition at line 13 of file [Filesystem.cc](#).

```
00014 {
00015     std::size_t position = file.find_last_of(".");
00016     return (std::string::npos == position || position == 0) ? "" : file.substr(position + 1);
00017 }
```

**5.15.2.2 filename()** `std::string filename (`  
`const std::string & file )`

Definition at line 19 of file [Filesystem.cc](#).

```
00020 {
00021     std::size_t position = file.find_last_of(".");
00022     std::size_t pos      = file.find_last_of("\\\\/");
00023     return (std::string::npos == pos) ? file.substr(0, position) : file.substr(pos + 1, position - pos
- 1);
00024 }
```

**5.15.2.3 path()** `std::string path (`  
`const std::string & file )`

Definition at line 7 of file [Filesystem.cc](#).

```
00008 {
00009     std::size_t pos = file.find_last_of("\\\\/");
00010     return (std::string::npos == pos) ? "" : file.substr(0, pos);
00011 }
```

## 5.16 Filesystem.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include <string>
00008
00009 std::string path(const std::string&);
00010 std::string extension(const std::string&);
00011 std::string filename(const std::string&);
```

## 5.17 libs/core/include/Formatters.h File Reference

```
#include "Bits.h"
#include <iosfwd>
#include <string>
```



## Functions

- `std::string to_dec` (const [Buffer](#) &b, const `std::size_t` &begin=0, const `std::size_t` &end=-1)
- `std::string to_dec` (const [bit8\\_t](#) &)
- `std::string to_dec` (const [bit16\\_t](#) &)
- `std::string to_dec` (const [bit32\\_t](#) &)
- `std::string to_dec` (const [bit64\\_t](#) &)
- `std::string to_hex` (const [Buffer](#) &b, const `std::size_t` &begin=0, const `std::size_t` &end=-1)
- `std::string to_hex` (const [bit8\\_t](#) &)
- `std::string to_hex` (const [bit16\\_t](#) &)
- `std::string to_hex` (const [bit32\\_t](#) &)
- `std::string to_hex` (const [bit64\\_t](#) &)
- `std::string to_bin` (const [Buffer](#) &b, const `std::size_t` &begin=0, const `std::size_t` &end=-1)
- `std::string to_bin` (const [bit8\\_t](#) &)
- `std::string to_bin` (const [bit16\\_t](#) &)
- `std::string to_bin` (const [bit32\\_t](#) &)
- `std::string to_bin` (const [bit64\\_t](#) &)
- `std::string to_oct` (const [Buffer](#) &b, const `std::size_t` &begin=0, const `std::size_t` &end=-1)
- `std::string to_oct` (const [bit8\\_t](#) &)
- `std::string to_oct` (const [bit16\\_t](#) &)
- `std::string to_oct` (const [bit32\\_t](#) &)
- `std::string to_oct` (const [bit64\\_t](#) &)

### 5.17.1 Detailed Description

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Definition in file [Formatters.h](#).

### 5.17.2 Function Documentation

**5.17.2.1 to\_bin()** [1/5] `std::string to_bin (`  
`const bit16\_t & b )`

Definition at line 71 of file [Formatters.cc](#).

```
00071 { return fmt::format("#{016b}", b); }
```

**5.17.2.2 to\_bin()** [2/5] `std::string to_bin (`  
`const bit32\_t & b )`

Definition at line 73 of file [Formatters.cc](#).

```
00073 { return fmt::format("#{032b}", b); }
```

**5.17.2.3 to\_bin()** [3/5] `std::string to_bin (`  
`const bit64_t & b )`

Definition at line 75 of file [Formatters.cc](#).

```
00075 { return fmt::format("#{:064b}", b); }
```

**5.17.2.4 to\_bin()** [4/5] `std::string to_bin (`  
`const bit8_t & b )`

Definition at line 69 of file [Formatters.cc](#).

```
00069 { return fmt::format("#{:08b}", b); }
```

**5.17.2.5 to\_bin()** [5/5] `std::string to_bin (`  
`const Buffer & b,`  
`const std::size_t & begin = 0,`  
`const std::size_t & end = -1 )`

Definition at line 56 of file [Formatters.cc](#).

```
00057 {  
00058     std::size_t iend = end;  
00059     if(iend == -1) iend = b.size();  
00060     std::string ret;  
00061     for(std::size_t k = begin; k < iend; k++)  
00062     {  
00063         ret += to_bin(b[k]);  
00064         ret += " - ";  
00065     }  
00066     return ret;  
00067 }
```

**5.17.2.6 to\_dec()** [1/5] `std::string to_dec (`  
`const bit16_t & b )`

Definition at line 29 of file [Formatters.cc](#).

```
00029 { return fmt::format("#{:d}", b); }
```

**5.17.2.7 to\_dec()** [2/5] `std::string to_dec (`  
`const bit32_t & b )`

Definition at line 31 of file [Formatters.cc](#).

```
00031 { return fmt::format("#{:d}", b); }
```

**5.17.2.8 to\_dec()** [3/5] `std::string to_dec (`  
`const bit64_t & b )`

Definition at line 33 of file [Formatters.cc](#).

```
00033 { return fmt::format("#{:d}", b); }
```

**5.17.2.9 to\_dec()** [4/5] `std::string to_dec (`  
`const bit8\_t & b )`

Definition at line 27 of file [Formatters.cc](#).

```
00027 { return fmt::format("#{d}", b); }
```

**5.17.2.10 to\_dec()** [5/5] `std::string to_dec (`  
`const Buffer & b,`  
`const std::size_t & begin = 0,`  
`const std::size_t & end = -1 )`

Definition at line 14 of file [Formatters.cc](#).

```
00015 {  
00016     std::size_t iend = end;  
00017     if(iend == -1) iend = b.size();  
00018     std::string ret;  
00019     for(std::size_t k = begin; k < iend; k++)  
00020     {  
00021         ret += to_dec(b[k]);  
00022         ret += " - ";  
00023     }  
00024     return ret;  
00025 }
```

**5.17.2.11 to\_hex()** [1/5] `std::string to_hex (`  
`const bit16\_t & b )`

Definition at line 50 of file [Formatters.cc](#).

```
00050 { return fmt::format("#{04x}", b); }
```

**5.17.2.12 to\_hex()** [2/5] `std::string to_hex (`  
`const bit32\_t & b )`

Definition at line 52 of file [Formatters.cc](#).

```
00052 { return fmt::format("#{08x}", b); }
```

**5.17.2.13 to\_hex()** [3/5] `std::string to_hex (`  
`const bit64\_t & b )`

Definition at line 54 of file [Formatters.cc](#).

```
00054 { return fmt::format("#{016x}", b); }
```

**5.17.2.14 to\_hex()** [4/5] `std::string to_hex (`  
`const bit8\_t & b )`

Definition at line 48 of file [Formatters.cc](#).

```
00048 { return fmt::format("#{02x}", b); }
```

**5.17.2.15 to\_hex()** [5/5] `std::string to_hex (`  
    `const Buffer & b,`  
    `const std::size_t & begin = 0,`  
    `const std::size_t & end = -1 )`

Definition at line 35 of file [Formatters.cc](#).

```
00036 {  
00037     std::size_t iend = end;  
00038     if(iend == -1) iend = b.size();  
00039     std::string ret;  
00040     for(std::size_t k = begin; k < iend; k++)  
00041     {  
00042         ret += to_hex(b[k]);  
00043         ret += " - ";  
00044     }  
00045     return ret;  
00046 }
```

**5.17.2.16 to\_oct()** [1/5] `std::string to_oct (`  
    `const bit16_t & b )`

Definition at line 92 of file [Formatters.cc](#).

```
00092 { return fmt::format("{:#08o}", b); }
```

**5.17.2.17 to\_oct()** [2/5] `std::string to_oct (`  
    `const bit32_t & b )`

Definition at line 94 of file [Formatters.cc](#).

```
00094 { return fmt::format("{:#016o}", b); }
```

**5.17.2.18 to\_oct()** [3/5] `std::string to_oct (`  
    `const bit64_t & b )`

Definition at line 96 of file [Formatters.cc](#).

```
00096 { return fmt::format("{:#032o}", b); }
```

**5.17.2.19 to\_oct()** [4/5] `std::string to_oct (`  
    `const bit8_t & b )`

Definition at line 90 of file [Formatters.cc](#).

```
00090 { return fmt::format("{:#04o}", b); }
```

```

5.17.2.20 to_oct() [5/5] std::string to_oct (
    const Buffer & b,
    const std::size_t & begin = 0,
    const std::size_t & end = -1 )

```

Definition at line 77 of file [Formatters.cc](#).

```

00078 {
00079     std::size_t iend = end;
00080     if(iend == -1) iend = b.size();
00081     std::string ret;
00082     for(std::size_t k = begin; k < iend; k++)
00083     {
00084         ret += to_oct(b[k]);
00085         ret += " - ";
00086     }
00087     return ret;
00088 }

```

## 5.18 Formatters.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006
00007 #include "Bits.h"
00008
00009 #include <iosfwd>
00010 #include <string>
00011
00012 class Buffer;
00013
00014 std::string to_dec(const Buffer& b, const std::size_t& begin = 0, const std::size_t& end = -1);
00015 std::string to_dec(const bit8_t&);
00016 std::string to_dec(const bit16_t&);
00017 std::string to_dec(const bit32_t&);
00018 std::string to_dec(const bit64_t&);
00019
00020 std::string to_hex(const Buffer& b, const std::size_t& begin = 0, const std::size_t& end = -1);
00021 std::string to_hex(const bit8_t&);
00022 std::string to_hex(const bit16_t&);
00023 std::string to_hex(const bit32_t&);
00024 std::string to_hex(const bit64_t&);
00025
00026 std::string to_bin(const Buffer& b, const std::size_t& begin = 0, const std::size_t& end = -1);
00027 std::string to_bin(const bit8_t&);
00028 std::string to_bin(const bit16_t&);
00029 std::string to_bin(const bit32_t&);
00030 std::string to_bin(const bit64_t&);
00031
00032 std::string to_oct(const Buffer& b, const std::size_t& begin = 0, const std::size_t& end = -1);
00033 std::string to_oct(const bit8_t&);
00034 std::string to_oct(const bit16_t&);
00035 std::string to_oct(const bit32_t&);
00036 std::string to_oct(const bit64_t&);

```

## 5.19 libs/core/include/Interface.h File Reference

```

#include "AppVersion.h"
#include "Buffer.h"
#include "Version.h"
#include "VersionInfos.h"
#include <map>
#include <memory>
#include <semver.hpp>
#include <spdlog/logger.h>
#include <string>

```

## Classes

- class [Interface](#)
- class [InterfaceReader](#)
- class [InterfaceWriter](#)

## Enumerations

- enum class [InterfaceType](#) { [Unknown](#) = 0 , [Reader](#) = 1 , [Writer](#) = 2 }  
*template class should implement void SOURCE::start(); bool SOURCE::next(); void SOURCE::end(); const Buffer& SOURCE::getBuffer();*

### 5.19.1 Detailed Description

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Definition in file [Interface.h](#).

### 5.19.2 Enumeration Type Documentation

#### 5.19.2.1 InterfaceType `enum class InterfaceType [strong]`

template class should implement void SOURCE::start(); bool SOURCE::next(); void SOURCE::end(); const Buffer& SOURCE::getBuffer();

void DESTINATION::begin(); void DESTINATION::processDIF(const DIFPtr&); void DESTINATION::process↔Frame(const DIFPtr&,const std::uint32\_t& frameIndex); void DESTINATION::processPadInFrame(const DIFPtr&,const std::uint32\_t& frameIndex,const std::uint32\_t& channelIndex); void DESTINATION::processSlowControl(const Buffer&); void DESTINATION::end();

#### Enumerator

Unknown	
Reader	
Writer	

Definition at line 32 of file [Interface.h](#).

```
00033 {
00034     Unknown = 0,
00035     Reader   = 1,
00036     Writer   = 2
00037 };
```

## 5.20 Interface.h

[Go to the documentation of this file.](#)

```

00001
00004 #pragma once
00005
00006 #include "AppVersion.h"
00007 #include "Buffer.h"
00008 #include "Version.h"
00009 #include "VersionInfos.h"
00010
00011 #include <map>
00012 #include <memory>
00013 #include <semver.hpp>
00014 #include <spdlog/logger.h>
00015 #include <string>
00016
00032 enum class InterfaceType
00033 {
00034     Unknown = 0,
00035     Reader = 1,
00036     Writer = 2
00037 };
00038
00039 class Interface
00040 {
00041 public:
00042     Interface(const std::string& name, const std::string& version, const InterfaceType& type) :
00043         m_Name(name), m_Version(version) {}
00043     virtual ~Interface() = default;
00044     virtual void start(const VersionInfos& ver) {}
00045     virtual void end() {}
00046     virtual void startEvent() {}
00047     virtual void endEvent() {}
00048     virtual void startDIF() {}
00049     virtual void endDIF() {}
00050     virtual void startFrame() {}
00051     virtual void endFrame() {}
00052     virtual void startPad() {}
00053     virtual void endPad() {}
00054     std::shared_ptr<spdlog::logger>& log() { return m_Logger; }
00055     void setLogger(const std::shared_ptr<spdlog::logger>& logger) { m_Logger
= logger; }
00056     std::string getName() { return m_Name; }
00057     Version getVersion() { return m_Version; }
00058     std::uint32_t getEventNumber() { return m_EventNumber; }
00059     void setEventNumber(const std::uint32_t& nbr) { m_EventNumber = nbr; }
00060     std::uint32_t getRunNumber() { return m_RunNumber; }
00061     void setRunNumber(const std::uint32_t& nbr) { m_RunNumber = nbr; }
00062
00063 protected:
00064     std::uint32_t m_EventNumber{0};
00065     std::uint32_t m_RunNumber{0};
00066
00067 private:
00068     std::shared_ptr<spdlog::logger> m_Logger{nullptr};
00069     std::string m_Name;
00070     Version m_Version;
00071     InterfaceType m_Type{InterfaceType::Unknown};
00072 };
00073
00074 class InterfaceReader : public Interface
00075 {
00076 public:
00077     InterfaceReader(const std::string& name, const std::string& version) : Interface(name, version,
InterfaceType::Reader) {}
00078     virtual ~InterfaceReader() = default;
00079
00080 protected:
00081     Buffer m_Buffer;
00082 };
00083
00084 class InterfaceWriter : public Interface
00085 {
00086 public:
00087     InterfaceWriter(const std::string& name, const std::string& version) : Interface(name, version,
InterfaceType::Writer) {}
00088
00089     void addCompatibility(const std::string& name, const std::string& version) { m_Compatible[name] =
version; }
00090
00091     std::map<std::string, std::string> getCompatibility() { return m_Compatible; }
00092
00093     bool checkCompatibility(const std::string& name, const std::string& version)
00094     {
00095         if(m_Compatible.find(name) != m_Compatible.end())
00096         {
00097             auto ran = semver::range::detail::range(m_Compatible[name]);
00098             semver::version ver = semver::version(version);
00099             if(ran.satisfies(ver, false)) { return true; }

```

```

00100         else
00101             return false;
00102     }
00103     else
00104         return false;
00105     }
00106     virtual ~InterfaceWriter() = default;
00107
00108 private:
00109     std::map<std::string, std::string> m_Compatible;
00110 };

```

## 5.21 libs/core/include/Payload.h File Reference

```

#include "Buffer.h"
#include "Exception.h"
#include <fmt/format.h>

```

### Classes

- class [Payload](#)

#### 5.21.1 Detailed Description

##### Copyright

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Definition in file [Payload.h](#).

## 5.22 Payload.h

[Go to the documentation of this file.](#)

```

00001
00004 #pragma once
00005
00006 #include "Buffer.h"
00007 #include "Exception.h"
00008
00009 #include <fmt/format.h>
00010
00011 class Payload : public Buffer
00012 {
00013 public:
00014     explicit Payload(const std::int32_t& detector_id) : m_DetectorID(detector_id) {}
00015     void setBuffer(const Buffer& buffer);
00016     std::uint32_t getEndOfDIFData() const;
00017     std::uint32_t getSizeAfterDIFPtr() const;
00018     virtual std::uint32_t getNumberOfFrames() const = 0;
00019     virtual std::uint32_t getThresholdStatus(const std::uint32_t&, const std::uint32_t&) const = 0;
00020     virtual std::uint32_t getDIFid() const = 0;
00021     virtual std::uint32_t getDTC() const = 0;
00022     virtual std::uint32_t getGTC() const = 0;
00023     virtual std::uint32_t getBCID() const = 0;
00024     virtual std::uint64_t getAbsoluteBCID() const = 0;
00025     virtual std::uint32_t getASICid(const std::uint32_t&) const = 0;
00026     virtual std::uint32_t getFrameBCID(const std::uint32_t&) const = 0;
00027     virtual std::uint32_t getFrameTimeToTrigger(const std::uint32_t&) const = 0;
00028
00029     std::uint32_t getDetectorID()const { return m_DetectorID; }
00030
00031     virtual ~Payload() {}
00032
00033 protected:

```



```

00034 virtual void parsePayload() = 0;
00035 std::int32_t m_DetectorID{-1};
00036 std::uint32_t theGetFramePtrReturn_{0};
00037 };
00038
00039 inline void Payload::setBuffer(const Buffer& buffer)
00040 {
00041     set(buffer);
00042     parsePayload();
00043 }
00044
00045 inline std::uint32_t Payload::getEndOfDIFData()const { return theGetFramePtrReturn_; }
00046
00047 inline std::uint32_t Payload::getSizeAfterDIFPtr()const { return size() - theGetFramePtrReturn_; }

```

## 5.23 libs/core/include/Payload100.h File Reference

```

#include "Payload.h"
#include <vector>

```

### Classes

- class [Payload100](#)

### 5.23.1 Detailed Description

#### Copyright

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Definition in file [Payload100.h](#).

## 5.24 Payload100.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006 #include "Payload.h"
00007
00008 #include <vector>
00009
00027 class Payload100 : public Payload
00028 {
00029 public:
00030     Payload100() : Payload(100) {}
00031     bool hasTemperature() const;
00032     bool hasAnalogReadout() const;
00033     virtual std::uint32_t getNumberOfFrames() const final;
00034     virtual std::uint32_t getThresholdStatus(const std::uint32_t&, const std::uint32_t&) const final;
00035     virtual std::uint32_t getDIFid() const final;
00036     virtual std::uint32_t getDTC() const final;
00037     virtual std::uint32_t getGTC() const final;
00038     virtual std::uint32_t getBCID() const final;
00039     virtual std::uint64_t getAbsoluteBCID() const final;
00040     virtual std::uint32_t getASICid(const std::uint32_t&) const final;
00041     virtual std::uint32_t getFrameBCID(const std::uint32_t&) const final;
00042     virtual std::uint32_t getFrameTimeToTrigger(const std::uint32_t&) const final;
00043     virtual ~Payload100();
00044     /*
00045     bool hasAnalogReadout() const;
00046
00047     bool hasSlowControl() const;
00048
00049     float getTemperatureDIF() const;
00050

```

```

00051 float getTemperatureASU1() const;
00052
00053 float getTemperatureASU2() const;
00054
00055 Buffer getSlowControl() const;
00056
00057 std::vector<bit8_t*> getFramesVector() const;
00058
00059 std::vector<bit8_t*> getLinesVector() const;
00060
00061 bool          hasLine(const std::uint32_t&) const;
00062
00063 bit8_t*      getFramePtr(const std::uint32_t&) const;
00064
00065 std::uint32_t getDIF_CRC() const;
00066
00067 private:
00068
00069 std::uint32_t getTASU1() const;
00070 std::uint32_t getTASU2() const;
00071 std::uint32_t getTDIF() const;
00072 */
00073
00074 private:
00075     bool          setFrameLevel(const std::uint32_t&, const std::uint32_t&, const std::uint32_t&)
const;
00076     std::uint16_t  m_Version{13};
00077     std::vector<bit8_t*> m_Lines;
00078     std::vector<bit8_t*> m_Frames;
00079     virtual void    parsePayload() final;
00080     std::uint32_t   parseAnalogLine(const std::uint32_t& idx);
00081     std::uint32_t   getNumberLines() const;
00082 };

```

## 5.25 libs/core/include/Payload150.h File Reference

```

#include "Payload.h"
#include <vector>

```

### Classes

- class [Payload150](#)

### 5.25.1 Detailed Description

#### Copyright

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Definition in file [Payload150.h](#).

## 5.26 Payload150.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006 #include "Payload.h"
00007
00008 #include <vector>
00009
00010 class Payload150 : public Payload
00011 {
00012 public:
00013     Payload150() : Payload(150) {}
00014     virtual std::uint32_t getNumberOfFrames() const final;

```

```

00015 virtual std::uint32_t getThresholdStatus(const std::uint32_t&, const std::uint32_t&) const final;
00016 virtual std::uint32_t getDIFid() const final;
00017 virtual std::uint32_t getDTC() const final;
00018 virtual std::uint32_t getGTC() const final;
00019 virtual std::uint32_t getBCID() const final;
00020 virtual std::uint64_t getAbsoluteBCID() const final;
00021 virtual std::uint32_t getASICid(const std::uint32_t&) const final;
00022 virtual std::uint32_t getFrameBCID(const std::uint32_t&) const final;
00023 virtual std::uint32_t getFrameTimeToTrigger(const std::uint32_t&) const final;
00024 virtual ~Payload150();
00025
00026 private:
00027     bool getFrameLevel(const std::uint32_t&, const std::uint32_t&, const std::uint32_t&)
        const;
00028     std::vector<bit8_t*> m_Frames;
00029     virtual void parsePayload() final;
00030 };

```

## 5.27 libs/core/include/PayloadLoader.h File Reference

```

#include "Payload.h"
#include "Payload100.h"
#include "Payload150.h"
#include <cstdint>
#include <memory>

```

### Classes

- class [PayloadLoader](#)

#### 5.27.1 Detailed Description

##### Copyright

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Definition in file [PayloadLoader.h](#).

## 5.28 PayloadLoader.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006
00007 #include "Payload.h"
00008 #include "Payload100.h"
00009 #include "Payload150.h"
00010
00011 #include <cstdint>
00012 #include <memory>
00013
00014 class PayloadLoader
00015 {
00016 public:
00017     PayloadLoader() = default;
00018     std::unique_ptr<Payload>& getPayload(const std::int32_t& detector_id)
00019     {
00020         switch(detector_id)
00021         {
00022             case 100: payload = std::make_unique<Payload100>(); break;
00023             case 150: payload = std::make_unique<Payload150>(); break;
00024         }
00025         return payload;
00026     }
00027
00028 private:
00029     std::unique_ptr<Payload> payload{nullptr};
00030 };

```

## 5.29 libs/core/include/RawBufferNavigator.h File Reference

```
#include "Buffer.h"
```

### Classes

- class [RawBufferNavigator](#)  
*class to navigate in the raw data buffer parse the header and send the payload as [Buffer](#)*

### 5.29.1 Detailed Description

#### Copyright

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Definition in file [RawBufferNavigator.h](#).

## 5.30 RawBufferNavigator.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include "Buffer.h"
00008
00024 class RawBufferNavigator
00025 {
00026 public:
00027     static void startAt(const int& start);
00028     RawBufferNavigator();
00029     ~RawBufferNavigator() = default;
00030     void         setBuffer(const Buffer&);
00031     std::uint32_t getDetectorID();
00032     bool         findStartOfPayload();
00033     std::int32_t  getStartOfPayload();
00034     bool         validPayload();
00035     Buffer        getPayload();
00036
00037 private:
00038     Buffer        m_Buffer;
00039     static std::int32_t m_StartPayload;
00040 };
```

## 5.31 libs/core/include/Timer.h File Reference

```
#include <chrono>
```

### Classes

- class [Timer](#)

### 5.31.1 Detailed Description

#### Copyright

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Definition in file [Timer.h](#).

### 5.32 Timer.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include <chrono>
00008
00009 class Timer
00010 {
00011 public:
00012     void start() { m_StartTime = std::chrono::high_resolution_clock::now(); }
00013     void stop() { m_StopTime = std::chrono::high_resolution_clock::now(); }
00014     float getElapsedTime() { return std::chrono::duration_cast<std::chrono::microseconds>(m_StopTime -
m_StartTime).count(); }
00015
00016 private:
00017     std::chrono::time_point<std::chrono::high_resolution_clock> m_StartTime;
00018     std::chrono::time_point<std::chrono::high_resolution_clock> m_StopTime;
00019 };
```

### 5.33 libs/core/include/Utilities.h File Reference

```
#include <cstdint>
```

#### Functions

- `std::uint64_t GrayToBin` (const `std::uint64_t` &n)

#### 5.33.1 Detailed Description

##### Copyright

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Definition in file [Utilities.h](#).

#### 5.33.2 Function Documentation

**5.33.2.1 GrayToBin()** `std::uint64_t GrayToBin (`  
`const std::uint64_t & n ) [inline]`

Definition at line 9 of file [Utilities.h](#).

```
00010 {
00011     std::uint64_t ish{1};
00012     std::uint64_t anss{n};
00013     std::uint64_t idiv{0};
00014     std::uint64_t ishmax{sizeof(std::uint64_t) * 8};
00015     while(true)
00016     {
00017         idiv = anss >> ish;
00018         anss ^= idiv;
00019         if(idiv <= 1 || ish == ishmax) return anss;
00020         ish <<= 1;
00021     }
00022 }
```

## 5.34 Utilities.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include <cstdint>
00008
00009 inline std::uint64_t GrayToBin(const std::uint64_t& n)
00010 {
00011     std::uint64_t ish{1};
00012     std::uint64_t anss{n};
00013     std::uint64_t idiv{0};
00014     std::uint64_t ishmax{sizeof(std::uint64_t) * 8};
00015     while(true)
00016     {
00017         idiv = anss >> ish;
00018         anss ^= idiv;
00019         if(idiv <= 1 || ish == ishmax) return anss;
00020         ish <<= 1;
00021     }
00022 }
```

## 5.35 libs/core/include/Version.h File Reference

```
#include <cstdint>
#include <semver.hpp>
#include <string>
```

### Classes

- class [Version](#)

### 5.35.1 Detailed Description

#### Copyright

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Definition in file [Version.h](#).

## 5.36 Version.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006
00007 #include <cstdint>
00008 #include <semver.hpp>
00009 #include <string>
00010
00011 class Version : public semver::version
00012 {
00013 public:
00014     Version(const std::uint8_t& mj, const std::uint8_t& mn, const std::uint8_t& pt, const
semver::prerelease& prt = semver::prerelease::none, const std::uint8_t& prn = 0) noexcept :
semver::version(mj, mn, pt, prt, prn) {}
00015     explicit Version(const std::string_view& str) : semver::version(str) {}
00016     Version() = default;
00017     std::uint8_t getMajor();
00018     std::uint8_t getMinor();
00019     std::uint8_t getPatch();
00020     std::string getPreRelease();
00021     std::uint8_t getPreReleaseNumber();
00022 };

```

## 5.37 libs/core/include/VersionInfos.h File Reference

```

#include "Version.h"
#include <string>
#include <utility>

```

### Classes

- class [VersionInfos](#)

### 5.37.1 Detailed Description

#### Copyright

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Definition in file [VersionInfos.h](#).

## 5.38 VersionInfos.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006
00007 #include "Version.h"
00008
00009 #include <string>
00010 #include <utility>
00011
00012 class VersionInfos
00013 {
00014 public:
00015     void setLibraryInfos(const std::string& name, const Version& version) {
m_StreamoutLibraryInfos = std::pair<std::string, Version>{name, version}; }
00016     void setReaderInfos(const std::string& name, const Version& version) {
m_ReaderInfos = std::pair<std::string, Version>{name, version}; }
00017     void setWriterInfos(const std::string& name, const Version& version) {
m_WriterInfos = std::pair<std::string, Version>{name, version}; }
00018     std::pair<std::string, Version> getLibraryInfos()const { return m_StreamoutLibraryInfos; }
00019     std::pair<std::string, Version> getReaderInfos()const { return m_ReaderInfos; }
00020     std::pair<std::string, Version> getWriterInfos()const { return m_WriterInfos; }
00021
00022 private:
00023     std::pair<std::string, Version> m_StreamoutLibraryInfos;
00024     std::pair<std::string, Version> m_ReaderInfos;
00025     std::pair<std::string, Version> m_WriterInfos;
00026 };

```

## 5.39 libs/core/include/Words.h File Reference

### Enumerations

- enum class [Hardware](#) : std::uint8\_t { [NUMBER\\_PAD](#) = 64 }

#### 5.39.1 Detailed Description

##### Copyright

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Definition in file [Words.h](#).

#### 5.39.2 Enumeration Type Documentation

##### 5.39.2.1 Hardware enum class [Hardware](#) : std::uint8\_t [strong]

##### Enumerator

NUMBER_PAD	
------------	--

Definition at line 8 of file [Words.h](#).

```
00009 {
00010     NUMBER_PAD = 64,
00011 };
```

## 5.40 Words.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 // TODO(flagarde): SUPPRESS THIS ***
00008 enum class Hardware : std::uint8_t
00009 {
00010     NUMBER_PAD = 64,
00011 };
```

## 5.41 libs/core/src/Bits.cc File Reference

```
#include "Bits.h"
```

### Functions

- std::ostream & [operator<<](#) (std::ostream &os, const [bit8\\_t](#) &c)  
*Stream operator to print bit8\_t aka std::uint8\_t and not char or unsigned char.*



### 5.41.1 Detailed Description

#### Copyright

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Definition in file [Bits.cc](#).

### 5.41.2 Function Documentation

**5.41.2.1 operator<<()** `std::ostream & operator<< (`  
`std::ostream & os,`  
`const bit8_t & c )`

Stream operator to print `bit8_t` aka `std::uint8_t` and not `char` or `unsigned char`.

Definition at line 8 of file [Bits.cc](#).

```
00008 { return os << c + 0; }
```

## 5.42 Bits.cc

[Go to the documentation of this file.](#)

```
00001
00006 #include "Bits.h"
00007
00008 std::ostream& operator<<(std::ostream& os, const bit8_t& c) { return os << c + 0; }
```

## 5.43 libs/core/src/BufferLooperCounter.cc File Reference

```
#include "BufferLooperCounter.h"
#include "Formatters.h"
#include <fmt/color.h>
```

## 5.44 BufferLooperCounter.cc

[Go to the documentation of this file.](#)

```
00001
00005 #include "BufferLooperCounter.h"
00006
00007 #include "Formatters.h"
00008
00009 #include <fmt/color.h>
00010
00011 void BufferLooperCounter::printAllCounters()
00012 {
00013     fmt::print(fg(fmt::color::crimson) | fmt::emphasis::bold, "BUFFER LOOP FINAL STATISTICS : \n");
00014     printCounter("Start of DIF header", DIFStarter);
00015     printCounter("Value after DIF data are processed", DIFPtrValueAtReturnedPos, std::ios_base::hex);
00016     printCounter("Size remaining in buffer after end of DIF data", SizeAfterDIFPtr);
00017     fmt::print(fg(fmt::color::crimson) | fmt::emphasis::bold, "Number of Slow Control found {} out of
which {} are bad\n", hasSlowControl, hasBadSlowControl);
00018     printCounter("Size remaining after all of data have been processed", SizeAfterAllData);
00019     printCounter("Number on non zero values in end of data buffer", NonZeroValusAtEndOfData);
00020 }
```

```

00021
00022 void BufferLooperCounter::printCounter(const std::string& description, const std::map<int, int>& m,
const std::ios_base::fmtflags& base)
00023 {
00024     std::string out{"statistics for " + description + " : \n"};
00025     for(std::map<int, int>::const_iterator it = m.begin(); it != m.end(); it++)
00026     {
00027         if(it != m.begin()) out += ",";
00028         out += " [";
00029         switch(base)
00030         {
00031             case std::ios_base::dec:    out += to_dec(static_cast<std::uint32_t>(it->first)); break;
00032             case std::ios_base::hex:    out += to_hex(static_cast<std::uint32_t>(it->first)); break;
00033             case std::ios_base::oct:    out += to_oct(static_cast<std::uint32_t>(it->first)); break;
00034             default: out += to_dec(static_cast<std::uint32_t>(it->first)); break;
00035         }
00036         out += "]" + std::to_string(it->second);
00037     }
00038     out += "\n";
00039     fmt::print(fg(fmt::color::crimson) | fmt::emphasis::bold, out);
00040 }

```

## 5.45 libs/core/src/DIFSlowControl.cc File Reference

```
#include "DIFSlowControl.h"
```

### Functions

- `std::string to_string` (const [DIFSlowControl](#) &c)

#### 5.45.1 Detailed Description

##### Copyright

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Definition in file [DIFSlowControl.cc](#).

#### 5.45.2 Function Documentation

**5.45.2.1 to\_string()** `std::string to_string (`  
`const DIFSlowControl & c )`

Definition at line 256 of file [DIFSlowControl.cc](#).

```

00257 {
00258     std::string ret;
00259     for(std::map<int, std::map<std::string, int>::const_iterator it = c.cbegin(); it != c.cend(); it++)
00260     {
00261         ret += "ASIC " + std::to_string(it->first) + " :\n";
00262         for(std::map<std::string, int>::const_iterator jt = (it->second).begin(); jt !=
(it->second).end(); jt++) ret += jt->first + " : " + std::to_string(jt->second) + "\n";
00263     }
00264     return ret;
00265 }

```

## 5.46 DIFSlowControl.cc

[Go to the documentation of this file.](#)

```

00001
00005 #include "DIFSlowControl.h"
00006
00007 DIFSlowControl::DIFSlowControl(const std::uint8_t& version, const std::uint8_t& DIFId, unsigned char*
      cbuf) : m_Version(version), m_DIFId(DIFId), m_AsicType(2)
00008 {
00009     if(cbuf[0] != 0xb1) return;
00010     int header_shift{6};
00011     if(m_Version < 8) m_NbrAsic = cbuf[5];
00012     else
00013     {
00014         m_DIFId      = cbuf[1];
00015         m_NbrAsic    = cbuf[2];
00016         header_shift = 3;
00017     }
00018     int size_hardroc1 = m_NbrAsic * 72 + header_shift + 1;
00019     if(cbuf[size_hardroc1 - 1] != 0xa1) size_hardroc1 = 0;
00020
00021     int size_hardroc2 = m_NbrAsic * 109 + header_shift + 1;
00022     if(cbuf[size_hardroc2 - 1] != 0xa1) size_hardroc2 = 0;
00023     if(size_hardroc1 != 0)
00024     {
00025         FillHR1(header_shift, cbuf);
00026         m_AsicType = 1;
00027     }
00028     else if(size_hardroc2 != 0)
00029         FillHR2(header_shift, cbuf);
00030     else
00031         return;
00032 }
00033
00034 inline std::uint8_t DIFSlowControl::getDIFId() { return m_DIFId; }
00035
00036 inline std::map<int, std::map<std::string, int>> DIFSlowControl::getChipsMap() { return m_MapSC; }
00037
00038 inline std::map<std::string, int> DIFSlowControl::getChipSlowControl(const int& asicid) { return
      m_MapSC[asicid]; }
00039
00040 inline int DIFSlowControl::getChipSlowControl(const std::int8_t& asicid, const std::string& param) {
      return getChipSlowControl(asicid)[param]; }
00041
00042 void DIFSlowControl::FillHR1(const int& header_shift, unsigned char* cbuf)
00043 {
00044     int nasic{cbuf[header_shift - 1]};
00045     int idx{header_shift};
00046     for(int k = 0; k < nasic; k++)
00047     {
00048         std::bitset<72 * 8> bs;
00049         // printf("%x %x \n", cbuf[idx+k*72+69], cbuf[idx+k*72+70]);
00050         for(int l = 71; l >= 0; l--)
00051         {
00052             // printf("%d %x : %d -->", l, cbuf[idx+k*72+l], (71-l)*8);
00053             for(int m = 0; m < 8; m++)
00054             {
00055                 if(((1 << m) & cbuf[idx + k * 72 + l]) != 0) bs.set((71 - l) * 8 + m, 1);
00056                 else
00057                     bs.set((71 - l) * 8 + m, 0);
00058                 // printf("%d", (int) bs[(71-l)*8+m]);
00059             }
00060             // printf("\n");
00061         }
00062         FillAsicHR1(bs);
00063     }
00064 }
00065
00066 void DIFSlowControl::FillHR2(const int& header_shift, unsigned char* cbuf)
00067 {
00068     // int scsizer=cbuf[header_shift-1]*109+(header_shift-1)+2;
00069     int nasic{cbuf[header_shift - 1]};
00070     int idx{header_shift};
00071     // std::cout<<" DIFSlowControl::FillHR nasic "<<nasic<<endl;
00072     for(int k = 0; k < nasic; k++)
00073     {
00074         std::bitset<109 * 8> bs;
00075         // printf("%x %x \n", cbuf[idx+k*109+69], cbuf[idx+k*109+70]);
00076         for(int l = 108; l >= 0; l--)
00077         {
00078             // printf("%d %x : %d -->", l, cbuf[idx+k*109+l], (71-l)*8);
00079             for(int m = 0; m < 8; m++)
00080             {
00081                 if(((1 << m) & cbuf[idx + k * 109 + l]) != 0) bs.set((108 - l) * 8 + m, 1);
00082                 else
00083                     bs.set((108 - l) * 8 + m, 0);

```

```

00084         // printf("%d", (int) bs[(71-1)*8+m]);
00085     }
00086     // printf("\n");
00087 }
00088     FillAsicHR2(bs);
00089 }
00090 }
00091
00092 void DIFSlowControl::FillAsicHR1(const std::bitset<72 * 8>& bs)
00093 {
00094     // Asic Id
00095     int asicid{0};
00096     for(int j = 0; j < 8; j++)
00097         if(bs[j + 9] != 0) asicid += (1 << (7 - j));
00098     std::map<std::string, int> mAsic;
00099     // Slow Control
00100     mAsic["SSC0"] = static_cast<int>(bs[575]);
00101     mAsic["SSC1"] = static_cast<int>(bs[574]);
00102     mAsic["SSC2"] = static_cast<int>(bs[573]);
00103     mAsic["Choix_caisson"] = static_cast<int>(bs[572]);
00104     mAsic["SW_50k"] = static_cast<int>(bs[571]);
00105     mAsic["SW_100k"] = static_cast<int>(bs[570]);
00106     mAsic["SW_100f"] = static_cast<int>(bs[569]);
00107     mAsic["SW_50f"] = static_cast<int>(bs[568]);
00108
00109     mAsic["Valid_DC"] = static_cast<int>(bs[567]);
00110     mAsic["ON_Discr1"] = static_cast<int>(bs[566]);
00111     mAsic["ON_Fsb"] = static_cast<int>(bs[565]);
00112     mAsic["ON_Otag"] = static_cast<int>(bs[564]);
00113     mAsic["ON_W"] = static_cast<int>(bs[563]);
00114     mAsic["ON_Ss"] = static_cast<int>(bs[562]);
00115     mAsic["ON_Buf"] = static_cast<int>(bs[561]);
00116     mAsic["ON_Paf"] = static_cast<int>(bs[560]);
00117     // Gain
00118     for(int i = 0; i < 64; i++)
00119     {
00120         int gain{0};
00121         for(int j = 0; j < 6; j++)
00122             if(bs[176 + i * 6 + j] != 0) gain += (1 << j);
00123         mAsic["Channel_" + std::to_string(i) + "_" + "Gain"] = gain;
00124         mAsic["Channel_" + std::to_string(i) + "_" + "cTest"] = bs[112 + i];
00125         mAsic["Channel_" + std::to_string(i) + "_" + "Valid_trig"] = static_cast<int>(bs[25 + i]);
00126     }
00127
00128     mAsic["ON_Otabg"] = static_cast<int>(bs[111]);
00129     mAsic["ON_Dac"] = static_cast<int>(bs[110]);
00130     mAsic["ON_Otadac"] = static_cast<int>(bs[109]);
00131     // DAC
00132     int dac1{0};
00133     for(int j = 0; j < 10; j++)
00134         if(bs[j + 99] != 0) dac1 += (1 << j);
00135     mAsic["DAC1"] = dac1;
00136     int dac0{0};
00137     for(int j = 0; j < 10; j++)
00138         if(bs[j + 89] != 0) dac0 += (1 << j);
00139     mAsic["DAC0"] = dac0;
00140     mAsic["EN_Raz_Ext"] = static_cast<int>(bs[23]);
00141     mAsic["EN_Raz_Int"] = static_cast<int>(bs[22]);
00142     mAsic["EN_Out_Raz_Int"] = static_cast<int>(bs[21]);
00143     mAsic["EN_Trig_Ext"] = static_cast<int>(bs[20]);
00144     mAsic["EN_Trig_Int"] = static_cast<int>(bs[19]);
00145     mAsic["EN_Out_Trig_Int"] = static_cast<int>(bs[18]);
00146     mAsic["Bypass_Chip"] = static_cast<int>(bs[17]);
00147     mAsic["HardrocHeader"] = static_cast<int>(asicid);
00148     mAsic["EN_Out_Discr1"] = static_cast<int>(bs[8]);
00149     mAsic["EN_Transmit_On"] = static_cast<int>(bs[7]);
00150     mAsic["EN_Dout"] = static_cast<int>(bs[6]);
00151     mAsic["EN_RamFull"] = static_cast<int>(bs[5]);
00152     m_MapSC[asicid] = mAsic;
00153 }
00154
00155 void DIFSlowControl::FillAsicHR2(const std::bitset<109 * 8>& bs)
00156 {
00157     int asicid{0};
00158     for(int j = 0; j < 8; j++)
00159         if(bs[j + (108 - 7) * 8 + 2] != 0) asicid += (1 << (7 - j));
00160     std::map<std::string, int> mAsic;
00161     for(int i = 0; i < 64; i++)
00162     {
00163         int gain{0};
00164         int mask{0};
00165         mAsic["Channel_" + std::to_string(i) + "_" + "cTest"] = bs[i];
00166         for(int j = 0; j < 8; j++)
00167             if(bs[64 + i * 8 + j] != 0) gain += (1 << j);
00168         mAsic["Channel_" + std::to_string(i) + "_" + "Gain"] = gain;
00169         for(int j = 0; j < 3; j++)
00170             if(bs[8 * 77 + 2 + i * 3 + j] != 0) mask += (1 << j);

```

```

00171     mAsic["Channel_" + std::to_string(i) + "_" + "Mask"] = mask;
00172 }
00173 mAsic["PwrOnPA"] = static_cast<int>(bs[8 * 72]);
00174 mAsic["Cmdb3SS"] = static_cast<int>(bs[8 * 72 + 1]);
00175 mAsic["Cmdb2SS"] = static_cast<int>(bs[8 * 72 + 2]);
00176 mAsic["Cmdb1SS"] = static_cast<int>(bs[8 * 72 + 3]);
00177 mAsic["Cmdb0SS"] = static_cast<int>(bs[8 * 72 + 4]);
00178 mAsic["SwSsc0"] = static_cast<int>(bs[8 * 72 + 5]);
00179 mAsic["SwSsc1"] = static_cast<int>(bs[8 * 72 + 6]);
00180 mAsic["SwSsc2"] = static_cast<int>(bs[8 * 72 + 7]);
00181
00182 mAsic["PwrOnBuff"] = static_cast<int>(bs[8 * 73]);
00183 mAsic["PwrOnSS"] = static_cast<int>(bs[8 * 73 + 1]);
00184 mAsic["PwrOnW"] = static_cast<int>(bs[8 * 73 + 2]);
00185 mAsic["Cmdb3Fsb2"] = static_cast<int>(bs[8 * 73 + 3]);
00186 mAsic["Cmdb2Fsb2"] = static_cast<int>(bs[8 * 73 + 4]);
00187 mAsic["Cmdb1Fsb2"] = static_cast<int>(bs[8 * 73 + 5]);
00188 mAsic["Cmdb0Fsb2"] = static_cast<int>(bs[8 * 73 + 6]);
00189 mAsic["Sw50k2"] = static_cast<int>(bs[8 * 73 + 7]);
00190
00191 mAsic["Sw100k2"] = static_cast<int>(bs[8 * 74]);
00192 mAsic["Sw100f2"] = static_cast<int>(bs[8 * 74 + 1]);
00193 mAsic["Sw50f2"] = static_cast<int>(bs[8 * 74 + 2]);
00194 mAsic["Cmdb3Fsb1"] = static_cast<int>(bs[8 * 74 + 3]);
00195 mAsic["Cmdb2Fsb1"] = static_cast<int>(bs[8 * 74 + 4]);
00196 mAsic["Cmdb1Fsb1"] = static_cast<int>(bs[8 * 74 + 5]);
00197 mAsic["Cmdb0Fsb1"] = static_cast<int>(bs[8 * 74 + 6]);
00198 mAsic["Sw50k1"] = static_cast<int>(bs[8 * 74 + 7]);
00199
00200 mAsic["Sw100k1"] = static_cast<int>(bs[8 * 75]);
00201 mAsic["Sw100f1"] = static_cast<int>(bs[8 * 75 + 1]);
00202 mAsic["Sw50f1"] = static_cast<int>(bs[8 * 75 + 2]);
00203 mAsic["Sel0"] = static_cast<int>(bs[8 * 75 + 3]);
00204 mAsic["Sel1"] = static_cast<int>(bs[8 * 75 + 4]);
00205 mAsic["PwrOnFsb"] = static_cast<int>(bs[8 * 75 + 5]);
00206 mAsic["PwrOnFsb1"] = static_cast<int>(bs[8 * 75 + 6]);
00207 mAsic["PwrOnFsb2"] = static_cast<int>(bs[8 * 75 + 7]);
00208
00209 mAsic["Sw50k0"] = static_cast<int>(bs[8 * 76]);
00210 mAsic["Sw100k0"] = static_cast<int>(bs[8 * 76 + 1]);
00211 mAsic["Sw100f0"] = static_cast<int>(bs[8 * 76 + 2]);
00212 mAsic["Sw50f0"] = static_cast<int>(bs[8 * 76 + 3]);
00213 mAsic["EnOtaQ"] = static_cast<int>(bs[8 * 76 + 4]);
00214 mAsic["OtaQ_PwrADC"] = static_cast<int>(bs[8 * 76 + 5]);
00215 mAsic["Discri_PwrA"] = static_cast<int>(bs[8 * 76 + 6]);
00216 mAsic["Discri2"] = static_cast<int>(bs[8 * 76 + 7]);
00217
00218 mAsic["Discri1"] = static_cast<int>(bs[8 * 77]);
00219 mAsic["RS_or_Discri"] = static_cast<int>(bs[8 * 77 + 1]);
00220
00221 mAsic["Header"] = asicid;
00222 for(int i = 0; i < 3; i++)
00223 {
00224     int B = 0;
00225     for(int j = 0; j < 10; j++)
00226         if(bs[8 * 102 + 2 + i * 10 + j] != 0) B += (1 << j);
00227     mAsic["B" + std::to_string(i)] = B;
00228 }
00229
00230 mAsic["Smalldac"] = static_cast<int>(bs[8 * 106]);
00231 mAsic["DacSw"] = static_cast<int>(bs[8 * 106 + 1]);
00232 mAsic["OtagBgSw"] = static_cast<int>(bs[8 * 106 + 2]);
00233 mAsic["Trig2b"] = static_cast<int>(bs[8 * 106 + 3]);
00234 mAsic["Trig1b"] = static_cast<int>(bs[8 * 106 + 4]);
00235 mAsic["Trig0b"] = static_cast<int>(bs[8 * 106 + 5]);
00236 mAsic["EnTrigOut"] = static_cast<int>(bs[8 * 106 + 6]);
00237 mAsic["DiscrOrOr"] = static_cast<int>(bs[8 * 106 + 7]);
00238
00239 mAsic["TrigExtVal"] = static_cast<int>(bs[8 * 107]);
00240 mAsic["RazChnIntVal"] = static_cast<int>(bs[8 * 107 + 1]);
00241 mAsic["RazChnExtVal"] = static_cast<int>(bs[8 * 107 + 2]);
00242 mAsic["ScOn"] = static_cast<int>(bs[8 * 107 + 3]);
00243 mAsic["CLKMux"] = static_cast<int>(bs[8 * 107 + 4]);
00244
00245 // EnOCDout1b EnOCDout2b EnOCTransmitOn1b EnOCTransmitOn2b EnOCChipsatb SelStartReadout SelEndReadout
00246 mAsic["SelEndReadout"] = static_cast<int>(bs[8 * 108 + 1]);
00247 mAsic["SelStartReadout"] = static_cast<int>(bs[8 * 108 + 2]);
00248 mAsic["EnOCChipsatb"] = static_cast<int>(bs[8 * 108 + 3]);
00249 mAsic["EnOCTransmitOn2b"] = static_cast<int>(bs[8 * 108 + 4]);
00250 mAsic["EnOCTransmitOn1b"] = static_cast<int>(bs[8 * 108 + 5]);
00251 mAsic["EnOCDout2b"] = static_cast<int>(bs[8 * 108 + 6]);
00252 mAsic["EnOCDout1b"] = static_cast<int>(bs[8 * 108 + 7]);
00253 m_MapSC[asicid] = mAsic;
00254 }
00255
00256 std::string to_string(const DIFSlowControl& c)

```

```

00257 {
00258     std::string ret;
00259     for(std::map<int, std::map<std::string, int>::const_iterator it = c.cbegin(); it != c.cend(); it++)
00260     {
00261         ret += "ASIC " + std::to_string(it->first) + " :\n";
00262         for(std::map<std::string, int>::const_iterator jt = (it->second).begin(); jt !=
(it->second).end(); jt++) ret += jt->first + " : " + std::to_string(jt->second) + "\n";
00263     }
00264     return ret;
00265 }

```

## 5.47 libs/core/src/Filesystem.cc File Reference

```
#include "Filesystem.h"
```

### Functions

- `std::string path` (const `std::string &file`)
- `std::string extension` (const `std::string &file`)
- `std::string filename` (const `std::string &file`)

#### 5.47.1 Detailed Description

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Definition in file [Filesystem.cc](#).

#### 5.47.2 Function Documentation

**5.47.2.1 extension()** `std::string extension (`  
`const std::string & file )`

Definition at line 13 of file [Filesystem.cc](#).

```

00014 {
00015     std::size_t position = file.find_last_of(".");
00016     return (std::string::npos == position || position == 0) ? "" : file.substr(position + 1);
00017 }

```

**5.47.2.2 filename()** `std::string filename (`  
`const std::string & file )`

Definition at line 19 of file [Filesystem.cc](#).

```

00020 {
00021     std::size_t position = file.find_last_of(".");
00022     std::size_t pos      = file.find_last_of("\\\\/");
00023     return (std::string::npos == pos) ? file.substr(0, position) : file.substr(pos + 1, position - pos
- 1);
00024 }

```

**5.47.2.3 path()** `std::string path (`  
`const std::string & file )`

Definition at line 7 of file [Filesystem.cc](#).

```
00008 {
00009     std::size_t pos = file.find_last_of("\\\\/");
00010     return (std::string::npos == pos) ? "" : file.substr(0, pos);
00011 }
```

## 5.48 Filesystem.cc

[Go to the documentation of this file.](#)

```
00001
00005 #include "Filesystem.h"
00006
00007 std::string path(const std::string& file)
00008 {
00009     std::size_t pos = file.find_last_of("\\\\/");
00010     return (std::string::npos == pos) ? "" : file.substr(0, pos);
00011 }
00012
00013 std::string extension(const std::string& file)
00014 {
00015     std::size_t position = file.find_last_of(".");
00016     return (std::string::npos == position || position == 0) ? "" : file.substr(position + 1);
00017 }
00018
00019 std::string filename(const std::string& file)
00020 {
00021     std::size_t position = file.find_last_of(".");
00022     std::size_t pos      = file.find_last_of("\\\\/");
00023     return (std::string::npos == pos) ? file.substr(0, position) : file.substr(pos + 1, position - pos
- 1);
00024 }
```

## 5.49 libs/core/src/Formatters.cc File Reference

```
#include "Formatters.h"
#include "Bits.h"
#include "Buffer.h"
#include "Words.h"
#include <fmt/format.h>
```

### Functions

- `std::string to_dec` (const [Buffer](#) &b, const `std::size_t` &begin, const `std::size_t` &end)
- `std::string to_dec` (const `bit8_t` &b)
- `std::string to_dec` (const `bit16_t` &b)
- `std::string to_dec` (const `bit32_t` &b)
- `std::string to_dec` (const `bit64_t` &b)
- `std::string to_hex` (const [Buffer](#) &b, const `std::size_t` &begin, const `std::size_t` &end)
- `std::string to_hex` (const `bit8_t` &b)
- `std::string to_hex` (const `bit16_t` &b)
- `std::string to_hex` (const `bit32_t` &b)
- `std::string to_hex` (const `bit64_t` &b)
- `std::string to_bin` (const [Buffer](#) &b, const `std::size_t` &begin, const `std::size_t` &end)
- `std::string to_bin` (const `bit8_t` &b)
- `std::string to_bin` (const `bit16_t` &b)
- `std::string to_bin` (const `bit32_t` &b)
- `std::string to_bin` (const `bit64_t` &b)
- `std::string to_oct` (const [Buffer](#) &b, const `std::size_t` &begin, const `std::size_t` &end)
- `std::string to_oct` (const `bit8_t` &b)
- `std::string to_oct` (const `bit16_t` &b)
- `std::string to_oct` (const `bit32_t` &b)
- `std::string to_oct` (const `bit64_t` &b)

### 5.49.1 Detailed Description

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Definition in file [Formatters.cc](#).

### 5.49.2 Function Documentation

**5.49.2.1 to\_bin()** [1/5] `std::string to_bin ( const bit16_t & b )`

Definition at line 71 of file [Formatters.cc](#).

```
00071 { return fmt::format("{:#016b}", b); }
```

**5.49.2.2 to\_bin()** [2/5] `std::string to_bin ( const bit32_t & b )`

Definition at line 73 of file [Formatters.cc](#).

```
00073 { return fmt::format("{:#032b}", b); }
```

**5.49.2.3 to\_bin()** [3/5] `std::string to_bin ( const bit64_t & b )`

Definition at line 75 of file [Formatters.cc](#).

```
00075 { return fmt::format("{:#064b}", b); }
```

**5.49.2.4 to\_bin()** [4/5] `std::string to_bin ( const bit8_t & b )`

Definition at line 69 of file [Formatters.cc](#).

```
00069 { return fmt::format("{:#08b}", b); }
```



**5.49.2.5 to\_bin()** [5/5] `std::string to_bin (`  
    `const Buffer & b,`  
    `const std::size_t & begin,`  
    `const std::size_t & end )`

Definition at line 56 of file [Formatters.cc](#).

```
00057 {  
00058     std::size_t iend = end;  
00059     if(iend == -1) iend = b.size();  
00060     std::string ret;  
00061     for(std::size_t k = begin; k < iend; k++)  
00062     {  
00063         ret += to_bin(b[k]);  
00064         ret += " - ";  
00065     }  
00066     return ret;  
00067 }
```

**5.49.2.6 to\_dec()** [1/5] `std::string to_dec (`  
    `const bit16_t & b )`

Definition at line 29 of file [Formatters.cc](#).

```
00029 { return fmt::format("#{d}", b); }
```

**5.49.2.7 to\_dec()** [2/5] `std::string to_dec (`  
    `const bit32_t & b )`

Definition at line 31 of file [Formatters.cc](#).

```
00031 { return fmt::format("#{d}", b); }
```

**5.49.2.8 to\_dec()** [3/5] `std::string to_dec (`  
    `const bit64_t & b )`

Definition at line 33 of file [Formatters.cc](#).

```
00033 { return fmt::format("#{d}", b); }
```

**5.49.2.9 to\_dec()** [4/5] `std::string to_dec (`  
    `const bit8_t & b )`

Definition at line 27 of file [Formatters.cc](#).

```
00027 { return fmt::format("#{d}", b); }
```

**5.49.2.10 to\_dec()** [5/5] std::string to\_dec (  
    const Buffer & b,  
    const std::size\_t & begin,  
    const std::size\_t & end )

Definition at line 14 of file [Formatters.cc](#).

```
00015 {  
00016     std::size_t iend = end;  
00017     if(iend == -1) iend = b.size();  
00018     std::string ret;  
00019     for(std::size_t k = begin; k < iend; k++)  
00020     {  
00021         ret += to_dec(b[k]);  
00022         ret += " - ";  
00023     }  
00024     return ret;  
00025 }
```

**5.49.2.11 to\_hex()** [1/5] std::string to\_hex (  
    const bit16\_t & b )

Definition at line 50 of file [Formatters.cc](#).

```
00050 { return fmt::format("{:#04x}", b); }
```

**5.49.2.12 to\_hex()** [2/5] std::string to\_hex (  
    const bit32\_t & b )

Definition at line 52 of file [Formatters.cc](#).

```
00052 { return fmt::format("{:#08x}", b); }
```

**5.49.2.13 to\_hex()** [3/5] std::string to\_hex (  
    const bit64\_t & b )

Definition at line 54 of file [Formatters.cc](#).

```
00054 { return fmt::format("{:#016x}", b); }
```

**5.49.2.14 to\_hex()** [4/5] std::string to\_hex (  
    const bit8\_t & b )

Definition at line 48 of file [Formatters.cc](#).

```
00048 { return fmt::format("{:#02x}", b); }
```

**5.49.2.15 to\_hex()** [5/5] `std::string to_hex (`  
    `const Buffer & b,`  
    `const std::size_t & begin,`  
    `const std::size_t & end )`

Definition at line 35 of file [Formatters.cc](#).

```
00036 {  
00037     std::size_t iend = end;  
00038     if(iend == -1) iend = b.size();  
00039     std::string ret;  
00040     for(std::size_t k = begin; k < iend; k++)  
00041     {  
00042         ret += to_hex(b[k]);  
00043         ret += " - ";  
00044     }  
00045     return ret;  
00046 }
```

**5.49.2.16 to\_oct()** [1/5] `std::string to_oct (`  
    `const bit16_t & b )`

Definition at line 92 of file [Formatters.cc](#).

```
00092 { return fmt::format("{:#08o}", b); }
```

**5.49.2.17 to\_oct()** [2/5] `std::string to_oct (`  
    `const bit32_t & b )`

Definition at line 94 of file [Formatters.cc](#).

```
00094 { return fmt::format("{:#016o}", b); }
```

**5.49.2.18 to\_oct()** [3/5] `std::string to_oct (`  
    `const bit64_t & b )`

Definition at line 96 of file [Formatters.cc](#).

```
00096 { return fmt::format("{:#032o}", b); }
```

**5.49.2.19 to\_oct()** [4/5] `std::string to_oct (`  
    `const bit8_t & b )`

Definition at line 90 of file [Formatters.cc](#).

```
00090 { return fmt::format("{:#04o}", b); }
```

```

5.49.2.20 to_oct() [5/5] std::string to_oct (
    const Buffer & b,
    const std::size_t & begin,
    const std::size_t & end )

```

Definition at line 77 of file [Formatters.cc](#).

```

00078 {
00079     std::size_t iend = end;
00080     if(iend == -1) iend = b.size();
00081     std::string ret;
00082     for(std::size_t k = begin; k < iend; k++)
00083     {
00084         ret += to_oct(b[k]);
00085         ret += " - ";
00086     }
00087     return ret;
00088 }

```

## 5.50 Formatters.cc

[Go to the documentation of this file.](#)

```

00001
00006 #include "Formatters.h"
00007
00008 #include "Bits.h"
00009 #include "Buffer.h"
00010 #include "Words.h"
00011
00012 #include <fmt/format.h>
00013
00014 std::string to_dec(const Buffer& b, const std::size_t& begin, const std::size_t& end)
00015 {
00016     std::size_t iend = end;
00017     if(iend == -1) iend = b.size();
00018     std::string ret;
00019     for(std::size_t k = begin; k < iend; k++)
00020     {
00021         ret += to_dec(b[k]);
00022         ret += " - ";
00023     }
00024     return ret;
00025 }
00026
00027 std::string to_dec(const bit8_t& b) { return fmt::format("{:#d}", b); }
00028
00029 std::string to_dec(const bit16_t& b) { return fmt::format("{:#d}", b); }
00030
00031 std::string to_dec(const bit32_t& b) { return fmt::format("{:#d}", b); }
00032
00033 std::string to_dec(const bit64_t& b) { return fmt::format("{:#d}", b); }
00034
00035 std::string to_hex(const Buffer& b, const std::size_t& begin, const std::size_t& end)
00036 {
00037     std::size_t iend = end;
00038     if(iend == -1) iend = b.size();
00039     std::string ret;
00040     for(std::size_t k = begin; k < iend; k++)
00041     {
00042         ret += to_hex(b[k]);
00043         ret += " - ";
00044     }
00045     return ret;
00046 }
00047
00048 std::string to_hex(const bit8_t& b) { return fmt::format("{:#02x}", b); }
00049
00050 std::string to_hex(const bit16_t& b) { return fmt::format("{:#04x}", b); }
00051
00052 std::string to_hex(const bit32_t& b) { return fmt::format("{:#08x}", b); }
00053
00054 std::string to_hex(const bit64_t& b) { return fmt::format("{:#016x}", b); }
00055
00056 std::string to_bin(const Buffer& b, const std::size_t& begin, const std::size_t& end)
00057 {
00058     std::size_t iend = end;
00059     if(iend == -1) iend = b.size();
00060     std::string ret;
00061     for(std::size_t k = begin; k < iend; k++)
00062     {
00063         ret += to_bin(b[k]);

```

```

00064     ret += " - ";
00065     }
00066     return ret;
00067 }
00068
00069 std::string to_bin(const bit8_t& b) { return fmt::format("{:#08b}", b); }
00070
00071 std::string to_bin(const bit16_t& b) { return fmt::format("{:#016b}", b); }
00072
00073 std::string to_bin(const bit32_t& b) { return fmt::format("{:#032b}", b); }
00074
00075 std::string to_bin(const bit64_t& b) { return fmt::format("{:#064b}", b); }
00076
00077 std::string to_oct(const Buffer& b, const std::size_t& begin, const std::size_t& end)
00078 {
00079     std::size_t iend = end;
00080     if(iend == -1) iend = b.size();
00081     std::string ret;
00082     for(std::size_t k = begin; k < iend; k++)
00083     {
00084         ret += to_oct(b[k]);
00085         ret += " - ";
00086     }
00087     return ret;
00088 }
00089
00090 std::string to_oct(const bit8_t& b) { return fmt::format("{:#04o}", b); }
00091
00092 std::string to_oct(const bit16_t& b) { return fmt::format("{:#08o}", b); }
00093
00094 std::string to_oct(const bit32_t& b) { return fmt::format("{:#016o}", b); }
00095
00096 std::string to_oct(const bit64_t& b) { return fmt::format("{:#032o}", b); }

```

## 5.51 libs/core/src/Payload100.cc File Reference

```

#include "Payload100.h"
#include "Utilities.h"

```

### Enumerations

- enum class `Size` : `std::uint8_t` {
  - `DATA_FORMAT_VERSION` = 1 , `DAQ_SOFTWARE_VERSION` = 2 , `SDCC_FIRMWARE_VERSION` = 2 ,
  - `DIF_FIRMWARE_VERSION` = 2 ,
  - `TIMESTAMP_SECONDES` = 4 , `TIMESTAMP_MILLISECONDS` = 4 , `GLOBAL_HEADER` = 1 , `DIF_IF` = 1 ,
  - `DIF_TRIGGER_COUNTER` = 4 , `INFORMATION_COUNTER` = 4 , `GLOBAL_TRIGGER_COUNTER` = 4 ,
  - `ABSOLUTE_BCID` = 6 ,
  - `BCID_DIF` = 3 , `NUMBER_LINE` = 1 , `TEMP_ASU1` = 4 , `TEMP_ASU2` = 4 ,
  - `TEMP_DIF` = 1 , `HEADER_LINE` = 1 , `NUMBER_CHIPS` = 1 , `LINE_SIZE` = 64 \* 2 ,
  - `TRAILER_LINE` = 1 , `FRAME_HEADER` = 1 , `MICROROC_HEADER` = 1 , `BCID` = 3 ,
  - `DATA` = 16 , `FRAME_TRAILER` = 1 , `GLOBAL_TRAILER` = 1 , `CRC_MSB` = 1 ,
  - `CRC_LSB` = 1 , `SC_HEADER` = 1 , `DIF_ID` = 1 , `ASIC_HEADER` = 1 ,
  - `SC_ASIC_SIZE` = 1 , `SC_TRAILER` = 1 , `DATA_FORMAT_VERSION` = 1 , `DAQ_SOFTWARE_VERSION` = 2
- ,
- `SDCC_FIRMWARE_VERSION` = 2 , `DIF_FIRMWARE_VERSION` = 2 , `TIMESTAMP_SECONDES` = 4 ,
- `TIMESTAMP_MILLISECONDS` = 4 ,
- `GLOBAL_HEADER` = 1 , `PMR_ID_SHIFT` = 1 , `PMR_NBASIC_SHIFT` = 1 , `PMR_FORMAT_SHIFT` = 1 ,
- `PMR_GTC_SHIFT` = 3 , `PMR_ABCID_SHIFT` = 6 , `PMR_BCID_SHIFT` = 3 , `PMR_LTRG_SHIFT` = 4 ,
- `HEADER_LINE` = 1 , `NUMBER_CHIPS` = 1 , `LINE_SIZE` = 64 \* 2 , `TRAILER_LINE` = 1 ,
- `FRAME_HEADER` = 1 , `MICROROC_HEADER` = 1 , `BCID` = 3 , `DATA` = 16 ,
- `FRAME_TRAILER` = 1 , `GLOBAL_TRAILER` = 1 , `CRC_MSB` = 1 , `CRC_LSB` = 1 ,
- `SC_HEADER` = 1 , `DIF_ID` = 1 , `ASIC_HEADER` = 1 , `SC_ASIC_SIZE` = 1 ,
- `SC_TRAILER` = 1 }

- enum class [Value](#) : std::uint8\_t {
  - [GLOBAL\\_HEADER](#) = 0xb0 , [GLOBAL\\_HEADER\\_TEMP](#) = 0xbb , [HEADER\\_LINE](#) = 0xc4 , [TRAILER\\_LINE](#) = 0xd4 ,
  - [FRAME\\_HEADER](#) = 0xb4 , [FRAME\\_TRAILER](#) = 0xa3 , [FRAME\\_TRAILER\\_ERROR](#) = 0xc3 ,
  - [GLOBAL\\_TRAILER](#) = 0xa0 ,
  - [SC\\_HEADER](#) = 0xb1 , [SC\\_TRAILER](#) = 0xa1 , [GLOBAL\\_HEADER](#) = 0xb0 , [GLOBAL\\_HEADER\\_TEMP](#) = 0xbb ,
  - [HEADER\\_LINE](#) = 0xc4 , [TRAILER\\_LINE](#) = 0xd4 , [FRAME\\_HEADER](#) = 0xb4 , [FRAME\\_TRAILER](#) = 0xa3 ,
  - [FRAME\\_TRAILER\\_ERROR](#) = 0xc3 , [GLOBAL\\_TRAILER](#) = 0xa0 , [SC\\_HEADER](#) = 0xb1 , [SC\\_TRAILER](#) = 0xa1 }

### 5.51.1 Detailed Description

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Definition in file [Payload100.cc](#).

### 5.51.2 Enumeration Type Documentation

#### 5.51.2.1 Size enum class [Size](#) : std::uint8\_t [strong]

##### Enumerator

DATA_FORMAT_VERSION	
DAQ_SOFTWARE_VERSION	
SDCC_FIRMWARE_VERSION	
DIF_FIRMWARE_VERSION	
TIMESTAMP_SECONDES	
TIMESTAMP_MILLISECONDS	
GLOBAL_HEADER	
DIF_IF	
DIF_TRIGGER_COUNTER	
INFORMATION_COUNTER	
GLOBAL_TRIGGER_COUNTER	
ABSOLUTE_BCID	
BCID_DIF	
NUMBER_LINE	
TEMP_ASU1	
TEMP_ASU2	
TEMP_DIF	
HEADER_LINE	
NUMBER_CHIPS	
LINE_SIZE	
TRAILER_LINE	
FRAME_HEADER	
MICROROC_HEADER	

## Enumerator

BCID	
DATA	
FRAME_TRAILER	
GLOBAL_TRAILER	
CRC_MSB	
CRC_LSB	
SC_HEADER	
DIF_ID	
ASIC_HEADER	
SC_ASIC_SIZE	
SC_TRAILER	
DATA_FORMAT_VERSION	
DAQ_SOFTWARE_VERSION	
SDCC_FIRMWARE_VERSION	
DIF_FIRMWARE_VERSION	
TIMESTAMP_SECONDES	
TIMESTAMP_MILLISECONDS	
GLOBAL_HEADER	
PMR_ID_SHIFT	
PMR_NBASIC_SHIFT	
PMR_FORMAT_SHIFT	
PMR_GTC_SHIFT	
PMR_ABCID_SHIFT	
PMR_BCID_SHIFT	
PMR_LTRG_SHIFT	
HEADER_LINE	
NUMBER_CHIPS	
LINE_SIZE	
TRAILER_LINE	
FRAME_HEADER	
MICROROC_HEADER	
BCID	
DATA	
FRAME_TRAILER	
GLOBAL_TRAILER	
CRC_MSB	
CRC_LSB	
SC_HEADER	
DIF_ID	
ASIC_HEADER	
SC_ASIC_SIZE	
SC_TRAILER	

Definition at line 9 of file [Payload100.cc](#).

```

00010 {
00011     // Header
00012     DATA_FORMAT_VERSION = 1,
00013     DAQ_SOFTWARE_VERSION = 2,
00014     SDCC_FIRMWARE_VERSION = 2,
00015     DIF_FIRMWARE_VERSION = 2,
00016     TIMESTAMP_SECONDES = 4,
00017     TIMESTAMP_MILLISECONDS = 4,

```

```

00018 // Payload
00019 GLOBAL_HEADER = 1,
00020 DIF_IF = 1,
00021 DIF_TRIGGER_COUNTER = 4,
00022 INFORMATION_COUNTER = 4,
00023 GLOBAL_TRIGGER_COUNTER = 4,
00024 ABSOLUTE_BCID = 6,
00025 BCID_DIF = 3,
00026 NUMBER_LINE = 1,
00027 TEMP_ASU1 = 4,
00028 TEMP_ASU2 = 4,
00029 TEMP_DIF = 1,
00030 HEADER_LINE = 1,
00031 NUMBER_CHIPS = 1,
00032 LINE_SIZE = 64 * 2,
00033 TRAILER_LINE = 1,
00034 FRAME_HEADER = 1,
00035 MICROROC_HEADER = 1,
00036 BCID = 3,
00037 DATA = 16,
00038 FRAME_TRAILER = 1,
00039 GLOBAL_TRAILER = 1,
00040 CRC_MSB = 1,
00041 CRC_LSB = 1,
00042 // Slowcontrol
00043 SC_HEADER = 1,
00044 DIF_ID = 1,
00045 ASIC_HEADER = 1,
00046 SC_ASIC_SIZE = 1,
00047 SC_TRAILER = 1
00048 };

```

**5.51.2.2 Value** enum class `Value` : `std::uint8_t` [strong]

#### Enumerator

GLOBAL_HEADER	
GLOBAL_HEADER_TEMP	
HEADER_LINE	
TRAILER_LINE	
FRAME_HEADER	
FRAME_TRAILER	
FRAME_TRAILER_ERROR	
GLOBAL_TRAILER	
SC_HEADER	
SC_TRAILER	
GLOBAL_HEADER	
GLOBAL_HEADER_TEMP	
HEADER_LINE	
TRAILER_LINE	
FRAME_HEADER	
FRAME_TRAILER	
FRAME_TRAILER_ERROR	
GLOBAL_TRAILER	
SC_HEADER	
SC_TRAILER	

Definition at line 54 of file `Payload100.cc`.

```

00055 {
00056     GLOBAL_HEADER = 0xb0,
00057     GLOBAL_HEADER_TEMP = 0xbb,
00058     HEADER_LINE = 0xc4,
00059     TRAILER_LINE = 0xd4,

```



```

00060 FRAME_HEADER      = 0xb4,
00061 FRAME_TRAILER    = 0xa3,
00062 FRAME_TRAILER_ERROR = 0xc3,
00063 GLOBAL_TRAILER    = 0xa0,
00064 SC_HEADER         = 0xb1,
00065 SC_TRAILER        = 0xa1
00066 };

```

## 5.52 Payload100.cc

[Go to the documentation of this file.](#)

```

00001
00005 #include "Payload100.h"
00006
00007 #include "Utilities.h"
00008
00009 enum class Size : std::uint8_t
00010 {
00011     // Header
00012     DATA_FORMAT_VERSION      = 1,
00013     DAO_SOFTWARE_VERSION      = 2,
00014     SDCC_FIRMWARE_VERSION     = 2,
00015     DIF_FIRMWARE_VERSION      = 2,
00016     TIMESTAMP_SECONDES        = 4,
00017     TIMESTAMP_MILLISECONDS    = 4,
00018     // Payload
00019     GLOBAL_HEADER              = 1,
00020     DIF_IF                     = 1,
00021     DIF_TRIGGER_COUNTER        = 4,
00022     INFORMATION_COUNTER        = 4,
00023     GLOBAL_TRIGGER_COUNTER     = 4,
00024     ABSOLUTE_BCID              = 6,
00025     BCID_DIF                   = 3,
00026     NUMBER_LINE                = 1,
00027     TEMP_ASU1                  = 4,
00028     TEMP_ASU2                  = 4,
00029     TEMP_DIF                   = 1,
00030     HEADER_LINE                = 1,
00031     NUMBER_CHIPS               = 1,
00032     LINE_SIZE                  = 64 * 2,
00033     TRAILER_LINE               = 1,
00034     FRAME_HEADER               = 1,
00035     MICROROC_HEADER            = 1,
00036     BCID                       = 3,
00037     DATA                      = 16,
00038     FRAME_TRAILER              = 1,
00039     GLOBAL_TRAILER             = 1,
00040     CRC_MSB                    = 1,
00041     CRC_LSB                    = 1,
00042     // Slowcontrol
00043     SC_HEADER                  = 1,
00044     DIF_ID                     = 1,
00045     ASIC_HEADER                = 1,
00046     SC_ASIC_SIZE               = 1,
00047     SC_TRAILER                 = 1
00048 };
00049
00050 static inline std::uint32_t operator+(const Size& a, const Size& b) { return
static_cast<std::uint32_t>(a) + static_cast<std::uint32_t>(b); }
00051 static inline std::uint32_t operator+(const std::uint32_t& a, const Size& b) { return a +
static_cast<std::uint32_t>(b); }
00052 static inline std::uint32_t operator+(const Size& a) { return static_cast<std::uint32_t>(a); }
00053
00054 enum class Value : std::uint8_t
00055 {
00056     GLOBAL_HEADER              = 0xb0,
00057     GLOBAL_HEADER_TEMP        = 0xbb,
00058     HEADER_LINE                = 0xc4,
00059     TRAILER_LINE              = 0xd4,
00060     FRAME_HEADER               = 0xb4,
00061     FRAME_TRAILER              = 0xa3,
00062     FRAME_TRAILER_ERROR       = 0xc3,
00063     GLOBAL_TRAILER             = 0xa0,
00064     SC_HEADER                  = 0xb1,
00065     SC_TRAILER                 = 0xa1
00066 };
00067
00068 inline void Payload100::parsePayload()
00069 {
00070     m_Frames.clear();
00071     m_Lines.clear();
00072     std::uint32_t fshift{static_cast<std::uint32_t>(Size::GLOBAL_HEADER)}; // Pass Global Header

```

```

00073     if(m_Version >= 13)
00074     {
00075         // Pass DIF_ID, DIF Trigger counter, Information counter, Global Trigger counter, Absolute BCID,
BCID DIF, NB line
00076         fshift += Size::DIF_IF + Size::DIF_TRIGGER_COUNTER + Size::INFORMATION_COUNTER +
Size::GLOBAL_TRIGGER_COUNTER + Size::ABSOLUTE_BCID + Size::BCID_DIF + Size::NUMBER_LINE;
00077         // If has temperature infos then pass Temp ASU 1, Temp ASU 2, Temp DIF
00078         if(hasTemperature()) fshift += Size::TEMP_ASU1 + Size::TEMP_ASU2 + Size::TEMP_DIF;
00079         // If has AnalogReadout pass them
00080         if(hasAnalogReadout()) fshift = parseAnalogLine(fshift); // to be implemented
00081     }
00082     else
00083         throw Exception(fmt::format("Version {} is not implemented", m_Version));
00084
00085     while(static_cast<std::uint8_t>(begin()[fshift]) !=
static_cast<std::uint8_t>(Value::GLOBAL_TRAILER))
00086     {
00087         // If I found a FRAME_HEADER there is 2 cases :
00088         // 1) Nothing inside so FRAME_TRAILER comes just after
00089         // 2) Come MICROROC Header, BCID, DATA max 128 times
00090         if(static_cast<std::uint8_t>(begin()[fshift]) == static_cast<std::uint8_t>(Value::FRAME_HEADER))
00091         {
00092             fshift += +Size::FRAME_HEADER;
00093             if(static_cast<std::uint8_t>(begin()[fshift]) == static_cast<std::uint8_t>(Value::FRAME_TRAILER))
|| static_cast<std::uint8_t>(begin()[fshift]) ==
static_cast<std::uint8_t>(Value::FRAME_TRAILER_ERROR)) { fshift += +Size::FRAME_TRAILER; }
00094         }
00095         else
00096         {
00097             while(static_cast<std::uint8_t>(begin()[fshift]) !=
static_cast<std::uint8_t>(Value::FRAME_TRAILER) && static_cast<std::uint8_t>(begin()[fshift]) !=
static_cast<std::uint8_t>(Value::FRAME_TRAILER_ERROR))
00098             {
00099                 m_Frames.push_back(&begin()[fshift]);
00100                 fshift += Size::MICROROC_HEADER + Size::BCID + Size::DATA;
00101             }
00102             fshift += +Size::FRAME_TRAILER;
00103         }
00104     }
00105     // Pass Global trailer
00106     fshift += +Size::GLOBAL_TRAILER;
00107     // Pass CRC MSB, CRC LSB
00108     fshift += Size::CRC_MSB + Size::CRC_LSB;
00109     theGetFramePtrReturn_ = fshift;
00110 }
00111
00112 inline bool Payload100::hasTemperature()const { return (static_cast<std::uint8_t>(begin()[0]) ==
static_cast<std::uint8_t>(Value::GLOBAL_HEADER_TEMP)); }
00113
00114 inline bool Payload100::hasAnalogReadout()const { return getNumberLines() != 0; }
00115
00116 inline std::uint32_t Payload100::getNumberLines()const
00117 {
00118     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER + Size::ABSOLUTE_BCID + Size::BCID_DIF};
00119     return ((begin()[shift] >> 4) & 0x5);
00120 }
00121
00122 inline std::uint32_t Payload100::parseAnalogLine(const std::uint32_t& idx)
00123 {
00124     std::uint32_t fshift{idx};
00125     // Pass Header line
00126     if(static_cast<std::uint8_t>(begin()[fshift]) != static_cast<std::uint8_t>(Value::HEADER_LINE))
return fshift;
00127     else
00128         fshift += +Size::HEADER_LINE;
00129     while(static_cast<std::uint8_t>(begin()[fshift]) != static_cast<std::uint8_t>(Value::TRAILER_LINE))
00130     {
00131         m_Lines.push_back(&begin()[fshift]);
00132         // Get Number of CHIPS
00133         std::uint32_t nchip{begin()[fshift]};
00134         // Pass Number of CHIPS, NB Asicline*64*16bits
00135         fshift += +Size::NUMBER_CHIPS + static_cast<std::uint32_t>(Size::LINE_SIZE) * nchip;
00136     }
00137     // Pass Trailer line
00138     fshift += +Size::TRAILER_LINE;
00139     return fshift;
00140 }
00141
00142 inline std::uint32_t Payload100::getNumberOfFrames()const { return m_Frames.size(); }
00143
00144 inline std::uint32_t Payload100::getThresholdStatus(const std::uint32_t& i, const std::uint32_t&
ipad)const { return (((std::uint32_t)getFrameLevel(i, ipad, 1)) | ((std::uint32_t)getFrameLevel(i,
ipad, 0) << 1)); }
00145
00146 inline bool Payload100::getFrameLevel(const std::uint32_t& i, const std::uint32_t& ipad, const
std::uint32_t& ilevel)const

```

```

00147 {
00148     std::uint32_t shift{Size::MICROROC_HEADER + Size::BCID};
00149     return ((m_Frames[i][shift + ((3 - ipad / 16) * 4 + (ipad % 16) / 4)] >> (7 - (((ipad % 16) % 4) * 2
+ ilevel))) & 0x1);
00150 }
00151
00152 inline std::uint32_t Payload100::getDIFid() const
00153 {
00154     std::uint32_t shift{+Size::GLOBAL_HEADER};
00155     return begin()[shift] & 0xFF;
00156 }
00157
00158 inline std::uint32_t Payload100::getDTC() const
00159 {
00160     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF};
00161     return (begin()[shift] << 24) + (begin()[shift + 1] << 16) + (begin()[shift + 2] << 8) + begin()[shift
+ 3];
00162 }
00163
00164 inline std::uint32_t Payload100::getGTC() const
00165 {
00166     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
Size::INFORMATION_COUNTER};
00167     return (begin()[shift] << 24) + (begin()[shift + 1] << 16) + (begin()[shift + 2] << 8) + begin()[shift
+ 3];
00168 }
00169
00170 inline std::uint32_t Payload100::getBCID() const
00171 {
00172     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER + Size::ABSOLUTE_BCID};
00173     return (begin()[shift] << 16) + (begin()[shift + 1] << 8) + begin()[shift + 2];
00174 }
00175
00176 inline std::uint64_t Payload100::getAbsoluteBCID() const
00177 {
00178     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER};
00179     std::uint64_t LBC = ((begin()[shift] << 16) | (begin()[shift + 1] << 8) | (begin()[shift + 2])) *
16777216ULL + ((begin()[shift + 3] << 16) | (begin()[shift + 4] << 8) | (begin()[shift + 5]));
00180     return LBC;
00181 }
00182
00183 inline std::uint32_t Payload100::getASICid(const std::uint32_t& i) const { return m_Frames[i][0] &
0xFF; }
00184
00185 inline std::uint32_t Payload100::getFrameBCID(const std::uint32_t& i) const
00186 {
00187     std::uint32_t shift{+Size::MICROROC_HEADER};
00188     return GrayToBin((m_Frames[i][shift] << 16) + (m_Frames[i][shift + 1] << 8) + m_Frames[i][shift + 2]);
00189 }
00190
00191 inline std::uint32_t Payload100::getFrameTimeToTrigger(const std::uint32_t& i) const { return getBCID()
- getFrameBCID(i); }
00192
00193 Payload100::~Payload100() {}
00194 /*
00195 inline bool Payload100::hasSlowControl() const { return theGetFramePtrReturn_ != size(); }
00196
00197 inline std::uint32_t Payload100::getTASU1() const
00198 {
00199     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER + Size::ABSOLUTE_BCID + Size::BCID_DIF +
Size::NUMBER_LINE};
00200     return (begin()[shift] << 24) + (begin()[shift + 1] << 16) + (begin()[shift + 2] << 8) + begin()[shift +
3];
00201 }
00202
00203 inline std::uint32_t Payload100::getTASU2() const
00204 {
00205     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER + Size::ABSOLUTE_BCID + Size::BCID_DIF +
Size::NUMBER_LINE + Size::TEMP_ASU1};
00206     return (begin()[shift] << 24) + (begin()[shift + 1] << 16) + (begin()[shift + 2] << 8) + begin()[shift +
3];
00207 }
00208
00209 inline std::uint32_t Payload100::getTDIF() const
00210 {
00211     std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER + Size::ABSOLUTE_BCID + Size::BCID_DIF +
Size::NUMBER_LINE + Size::TEMP_ASU1 + Size::TEMP_ASU2};
00212     return begin()[shift];
00213 }
00214
00215 inline float Payload100::getTemperatureDIF() const
00216 {

```

```

00217 if(!hasTemperature()) throw Exception("Don't have TemperatureDIF information");
00218 return 0.508 * getTDIF() - 9.659;
00219 }
00220
00221 inline float Payload100::getTemperatureASU1() const
00222 {
00223 if(!hasTemperature()) throw Exception("Don't have TemperatureASU1 information");
00224 return (getTASU1() >> 3) * 0.0625;
00225 }
00226
00227 inline float Payload100::getTemperatureASU2() const
00228 {
00229 if(!hasTemperature()) throw Exception("Don't have TemperatureASU2 information");
00230 return (getTASU2() >> 3) * 0.0625;
00231 }
00232
00233 inline Buffer Payload100::getSlowControl() const
00234 {
00235 if(hasSlowControl()) return Buffer(&begin()[getEndOfDIFData()], size() - getEndOfDIFData());
00236 else
00237 return Buffer();
00238 }
00239
00240 inline std::vector<bit8_t*> Payload100::getFramesVector() const { return m_Frames; }
00241
00242 inline std::vector<bit8_t*> Payload100::getLinesVector() const { return m_Lines; }
00243
00244 inline bool Payload100::hasLine(const std::uint32_t& line) const
00245 {
00246 std::uint32_t shift{Size::GLOBAL_HEADER + Size::DIF_IF + Size::DIF_TRIGGER_COUNTER +
    Size::INFORMATION_COUNTER + Size::GLOBAL_TRIGGER_COUNTER + Size::ABSOLUTE_BCID + Size::BCID_DIF};
00247 return ((begin()[shift] >> line) & 0x1);
00248 }
00249
00250 inline bit8_t* Payload100::getFramePtr(const std::uint32_t& i) const { return m_Frames[i]; }
00251
00252 inline std::uint32_t Payload100::getDIF_CRC() const
00253 {
00254 std::uint32_t shift{getEndOfDIFData() - (Size::CRC_MSB + Size::CRC_LSB)};
00255 return (begin()[shift] << 8) + begin()[shift + 1];
00256 }
00257
00258 */

```

## 5.53 libs/core/src/Payload150.cc File Reference

```

#include "Payload150.h"
#include "Utilities.h"

```

### Enumerations

- enum class `Size` : `std::uint8_t` {
  - `DATA_FORMAT_VERSION` = 1 , `DAQ_SOFTWARE_VERSION` = 2 , `SDCC_FIRMWARE_VERSION` = 2 ,
  - `DIF_FIRMWARE_VERSION` = 2 ,
  - `TIMESTAMP_SECONDES` = 4 , `TIMESTAMP_MILLISECONDS` = 4 , `GLOBAL_HEADER` = 1 , `DIF_IF` = 1 ,
  - `DIF_TRIGGER_COUNTER` = 4 , `INFORMATION_COUNTER` = 4 , `GLOBAL_TRIGGER_COUNTER` = 4 ,
  - `ABSOLUTE_BCID` = 6 ,
  - `BCID_DIF` = 3 , `NUMBER_LINE` = 1 , `TEMP_ASU1` = 4 , `TEMP_ASU2` = 4 ,
  - `TEMP_DIF` = 1 , `HEADER_LINE` = 1 , `NUMBER_CHIPS` = 1 , `LINE_SIZE` = 64 \* 2 ,
  - `TRAILER_LINE` = 1 , `FRAME_HEADER` = 1 , `MICROROC_HEADER` = 1 , `BCID` = 3 ,
  - `DATA` = 16 , `FRAME_TRAILER` = 1 , `GLOBAL_TRAILER` = 1 , `CRC_MSB` = 1 ,
  - `CRC_LSB` = 1 , `SC_HEADER` = 1 , `DIF_ID` = 1 , `ASIC_HEADER` = 1 ,
  - `SC_ASIC_SIZE` = 1 , `SC_TRAILER` = 1 , `DATA_FORMAT_VERSION` = 1 , `DAQ_SOFTWARE_VERSION` = 2
- ,
- `SDCC_FIRMWARE_VERSION` = 2 , `DIF_FIRMWARE_VERSION` = 2 , `TIMESTAMP_SECONDES` = 4 ,
- `TIMESTAMP_MILLISECONDS` = 4 ,
- `GLOBAL_HEADER` = 1 , `PMR_ID_SHIFT` = 1 , `PMR_NBASIC_SHIFT` = 1 , `PMR_FORMAT_SHIFT` = 1 ,
- `PMR_GTC_SHIFT` = 3 , `PMR_ABCID_SHIFT` = 6 , `PMR_BCID_SHIFT` = 3 , `PMR_LTRG_SHIFT` = 4 ,

```

HEADER_LINE = 1 , NUMBER_CHIPS = 1 , LINE_SIZE = 64 * 2 , TRAILER_LINE = 1 ,
FRAME_HEADER = 1 , MICROROC_HEADER = 1 , BCID = 3 , DATA = 16 ,
FRAME_TRAILER = 1 , GLOBAL_TRAILER = 1 , CRC_MSB = 1 , CRC_LSB = 1 ,
SC_HEADER = 1 , DIF_ID = 1 , ASIC_HEADER = 1 , SC_ASIC_SIZE = 1 ,
SC_TRAILER = 1 }

```

- enum class `Value` : `std::uint8_t` {

```

GLOBAL_HEADER = 0xb0 , GLOBAL_HEADER_TEMP = 0xbb , HEADER_LINE = 0xc4 , TRAILER_LINE = 0xd4 ,
FRAME_HEADER = 0xb4 , FRAME_TRAILER = 0xa3 , FRAME_TRAILER_ERROR = 0xc3 ,
GLOBAL_TRAILER = 0xa0 ,
SC_HEADER = 0xb1 , SC_TRAILER = 0xa1 , GLOBAL_HEADER = 0xb0 , GLOBAL_HEADER_TEMP = 0xbb ,
HEADER_LINE = 0xc4 , TRAILER_LINE = 0xd4 , FRAME_HEADER = 0xb4 , FRAME_TRAILER = 0xa3 ,
FRAME_TRAILER_ERROR = 0xc3 , GLOBAL_TRAILER = 0xa0 , SC_HEADER = 0xb1 , SC_TRAILER = 0xa1 }

```

### 5.53.1 Detailed Description

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Definition in file [Payload150.cc](#).

### 5.53.2 Enumeration Type Documentation

**5.53.2.1 Size** enum class `Size` : `std::uint8_t` [strong]

#### Enumerator

DATA_FORMAT_VERSION	
DAQ_SOFTWARE_VERSION	
SDCC_FIRMWARE_VERSION	
DIF_FIRMWARE_VERSION	
TIMESTAMP_SECONDES	
TIMESTAMP_MILLISECONDS	
GLOBAL_HEADER	
DIF_IF	
DIF_TRIGGER_COUNTER	
INFORMATION_COUNTER	
GLOBAL_TRIGGER_COUNTER	
ABSOLUTE_BCID	
BCID_DIF	
NUMBER_LINE	
TEMP_ASU1	
TEMP_ASU2	
TEMP_DIF	
HEADER_LINE	
NUMBER_CHIPS	

## Enumerator

LINE_SIZE	
TRAILER_LINE	
FRAME_HEADER	
MICROROC_HEADER	
BCID	
DATA	
FRAME_TRAILER	
GLOBAL_TRAILER	
CRC_MSB	
CRC_LSB	
SC_HEADER	
DIF_ID	
ASIC_HEADER	
SC_ASIC_SIZE	
SC_TRAILER	
DATA_FORMAT_VERSION	
DAQ_SOFTWARE_VERSION	
SDCC_FIRMWARE_VERSION	
DIF_FIRMWARE_VERSION	
TIMESTAMP_SECONDES	
TIMESTAMP_MILLISECONDS	
GLOBAL_HEADER	
PMR_ID_SHIFT	
PMR_NBASIC_SHIFT	
PMR_FORMAT_SHIFT	
PMR_GTC_SHIFT	
PMR_ABCID_SHIFT	
PMR_BCID_SHIFT	
PMR_LTRG_SHIFT	
HEADER_LINE	
NUMBER_CHIPS	
LINE_SIZE	
TRAILER_LINE	
FRAME_HEADER	
MICROROC_HEADER	
BCID	
DATA	
FRAME_TRAILER	
GLOBAL_TRAILER	
CRC_MSB	
CRC_LSB	
SC_HEADER	
DIF_ID	
ASIC_HEADER	
SC_ASIC_SIZE	
SC_TRAILER	

Definition at line 9 of file [Payload150.cc](#).

```
00010 {
```

```

00011 // Header
00012 DATA_FORMAT_VERSION = 1,
00013 DAQ_SOFTWARE_VERSION = 2,
00014 SDCC_FIRMWARE_VERSION = 2,
00015 DIF_FIRMWARE_VERSION = 2,
00016 TIMESTAMP_SECONDS = 4,
00017 TIMESTAMP_MILLISECONDS = 4,
00018 // Payload
00019 GLOBAL_HEADER = 1,
00020 PMR_ID_SHIFT = 1,
00021 PMR_NBASIC_SHIFT = 1,
00022 PMR_FORMAT_SHIFT = 1,
00023 PMR_GTC_SHIFT = 3,
00024 PMR_ABCID_SHIFT = 6,
00025 PMR_BCID_SHIFT = 3,
00026 PMR_LTRG_SHIFT = 4,
00027 //
00028 HEADER_LINE = 1,
00029 NUMBER_CHIPS = 1,
00030 LINE_SIZE = 64 * 2,
00031 TRAILER_LINE = 1,
00032 FRAME_HEADER = 1,
00033 MICROROC_HEADER = 1,
00034 BCID = 3,
00035 DATA = 16,
00036 FRAME_TRAILER = 1,
00037 GLOBAL_TRAILER = 1,
00038 CRC_MSB = 1,
00039 CRC_LSB = 1,
00040 // Slowcontrol
00041 SC_HEADER = 1,
00042 DIF_ID = 1,
00043 ASIC_HEADER = 1,
00044 SC_ASIC_SIZE = 1,
00045 SC_TRAILER = 1
00046 };

```

**5.53.2.2 Value** enum class `Value` : `std::uint8_t` [strong]

#### Enumerator

GLOBAL_HEADER
GLOBAL_HEADER_TEMP
HEADER_LINE
TRAILER_LINE
FRAME_HEADER
FRAME_TRAILER
FRAME_TRAILER_ERROR
GLOBAL_TRAILER
SC_HEADER
SC_TRAILER
GLOBAL_HEADER
GLOBAL_HEADER_TEMP
HEADER_LINE
TRAILER_LINE
FRAME_HEADER
FRAME_TRAILER
FRAME_TRAILER_ERROR
GLOBAL_TRAILER
SC_HEADER
SC_TRAILER

Definition at line 48 of file [Payload150.cc](#).

```

00049 {
00050     GLOBAL_HEADER           = 0xb0,
00051     GLOBAL_HEADER_TEMP     = 0xbb,
00052     HEADER_LINE            = 0xc4,
00053     TRAILER_LINE           = 0xd4,
00054     FRAME_HEADER           = 0xb4,
00055     FRAME_TRAILER          = 0xa3,
00056     FRAME_TRAILER_ERROR    = 0xc3,
00057     GLOBAL_TRAILER         = 0xa0,
00058     SC_HEADER              = 0xb1,
00059     SC_TRAILER             = 0xa1
00060 };

```

## 5.54 Payload150.cc

[Go to the documentation of this file.](#)

```

00001
00005 #include "Payload150.h"
00006
00007 #include "Utilities.h"
00008
00009 enum class Size : std::uint8_t
00010 {
00011     // Header
00012     DATA_FORMAT_VERSION     = 1,
00013     DAQ_SOFTWARE_VERSION     = 2,
00014     SDCC_FIRMWARE_VERSION    = 2,
00015     DIF_FIRMWARE_VERSION     = 2,
00016     TIMESTAMP_SECONDES       = 4,
00017     TIMESTAMP_MILLISECONDS    = 4,
00018     // Payload
00019     GLOBAL_HEADER            = 1,
00020     PMR_ID_SHIFT             = 1,
00021     PMR_NBASIC_SHIFT         = 1,
00022     PMR_FORMAT_SHIFT         = 1,
00023     PMR_GTC_SHIFT            = 3,
00024     PMR_ABCID_SHIFT          = 6,
00025     PMR_BCID_SHIFT           = 3,
00026     PMR_LTRG_SHIFT           = 4,
00027     //
00028     HEADER_LINE              = 1,
00029     NUMBER_CHIPS              = 1,
00030     LINE_SIZE                  = 64 * 2,
00031     TRAILER_LINE              = 1,
00032     FRAME_HEADER              = 1,
00033     MICROROC_HEADER           = 1,
00034     BCID                      = 3,
00035     DATA                      = 16,
00036     FRAME_TRAILER             = 1,
00037     GLOBAL_TRAILER            = 1,
00038     CRC_MSB                   = 1,
00039     CRC_LSB                   = 1,
00040     // Slowcontrol
00041     SC_HEADER                 = 1,
00042     DIF_ID                    = 1,
00043     ASIC_HEADER               = 1,
00044     SC_ASIC_SIZE              = 1,
00045     SC_TRAILER                = 1
00046 };
00047
00048 enum class Value : std::uint8_t
00049 {
00050     GLOBAL_HEADER           = 0xb0,
00051     GLOBAL_HEADER_TEMP     = 0xbb,
00052     HEADER_LINE            = 0xc4,
00053     TRAILER_LINE           = 0xd4,
00054     FRAME_HEADER           = 0xb4,
00055     FRAME_TRAILER          = 0xa3,
00056     FRAME_TRAILER_ERROR    = 0xc3,
00057     GLOBAL_TRAILER         = 0xa0,
00058     SC_HEADER              = 0xb1,
00059     SC_TRAILER             = 0xa1
00060 };
00061
00062 static inline std::uint32_t operator+(const Size& a, const Size& b) { return
static_cast<std::uint32_t>(a) + static_cast<std::uint32_t>(b); }
00063 static inline std::uint32_t operator+(const std::uint32_t& a, const Size& b) { return a +
static_cast<std::uint32_t>(b); }
00064 static inline std::uint32_t operator+(const Size& a) { return static_cast<std::uint32_t>(a); }
00065
00066 inline void Payload150::parsePayload()
00067 {

```



```

00068     m_Frames.clear();
00069     std::uint32_t fshift{static_cast<std::uint32_t>(Size::GLOBAL_HEADER)}; // Pass Global Header
00070     // Pass DIF_ID, DIF Trigger counter, Information counter, Global Trigger counter, Absolute BCID,
BCID DIF, NB line
00071     fshift += Size::PMR_ID_SHIFT + Size::PMR_NBASIC_SHIFT + Size::PMR_FORMAT_SHIFT + Size::PMR_GTC_SHIFT
+ Size::PMR_ABCID_SHIFT + Size::PMR_BCID_SHIFT + Size::PMR_LTRG_SHIFT;
00072     while(static_cast<std::uint8_t>(begin()[fshift]) !=
static_cast<std::uint8_t>(Value::GLOBAL_TRAILER))
00073     {
00074         m_Frames.push_back(&begin()[fshift]);
00075         fshift += Size::MICROROC_HEADER + Size::BCID + Size::DATA;
00076     }
00077     // Pass Global trailer
00078     fshift += +Size::GLOBAL_TRAILER;
00079     // Pass CRC MSB, CRC LSB
00080     fshift += Size::CRC_MSB + Size::CRC_LSB;
00081     theGetFramePtrReturn_ = fshift;
00082 }
00083
00084 inline std::uint32_t Payload150::getNumberOfFrames()const { return m_Frames.size(); }
00085
00086 inline std::uint32_t Payload150::getThresholdStatus(const std::uint32_t& i, const std::uint32_t&
ipad)const { return (((std::uint32_t)getFrameLevel(i, ipad, 1))) | ((std::uint32_t)getFrameLevel(i,
ipad, 0) << 1); }
00087
00088 inline bool Payload150::getFrameLevel(const std::uint32_t& i, const std::uint32_t& ipad, const
std::uint32_t& ilevel)const
00089 {
00090     std::uint32_t shift{Size::MICROROC_HEADER + Size::BCID};
00091     return ((m_Frames[i][shift + ((3 - ipad / 16) * 4 + (ipad % 16) / 4)] >> (7 - ((ipad % 16) % 4) * 2
+ ilevel))) & 0x1;
00092 }
00093
00094 inline std::uint32_t Payload150::getDIFid()const
00095 {
00096     std::uint32_t shift{+Size::GLOBAL_HEADER};
00097     return begin()[shift] & 0xFF;
00098 }
00099
00100 inline std::uint32_t Payload150::getGTC()const
00101 {
00102     std::uint32_t shift{Size::GLOBAL_HEADER + Size::PMR_ID_SHIFT + Size::PMR_NBASIC_SHIFT +
Size::PMR_FORMAT_SHIFT};
00103     return (begin()[shift] << 16) + (begin()[shift + 1] << 8) + begin()[shift + 2];
00104 }
00105
00106 inline std::uint64_t Payload150::getAbsoluteBCID()const
00107 {
00108     std::uint32_t shift{Size::GLOBAL_HEADER + Size::PMR_ID_SHIFT + Size::PMR_NBASIC_SHIFT +
Size::PMR_FORMAT_SHIFT + Size::PMR_GTC_SHIFT};
00109     std::uint64_t LBC = ((begin()[shift] << 8) | (begin()[shift + 1])) * 16777216ULL + ((begin()[shift +
2] << 24) | (begin()[shift + 3] << 16) | (begin()[shift + 4] << 8) | begin()[shift + 5]);
00110     return LBC;
00111 }
00112
00113 inline std::uint32_t Payload150::getDTC()const
00114 {
00115     // MAYBE NOR USEFUL
00116     std::uint32_t shift{};
00117     return (begin()[shift] << 24) + (begin()[shift + 1] << 16) + (begin()[shift + 2] << 8) + begin()[shift
+ 3];
00118 }
00119
00120 inline std::uint32_t Payload150::getBCID()const
00121 {
00122     std::uint32_t shift{Size::GLOBAL_HEADER + Size::PMR_ID_SHIFT + Size::PMR_NBASIC_SHIFT +
Size::PMR_FORMAT_SHIFT + Size::PMR_GTC_SHIFT + Size::PMR_ABCID_SHIFT};
00123     return (begin()[shift] << 16) + (begin()[shift + 1] << 8) + begin()[shift + 2];
00124 }
00125
00126 inline std::uint32_t Payload150::getASICid(const std::uint32_t& i)const { return m_Frames[i][0] &
0xFF; }
00127
00128 inline std::uint32_t Payload150::getFrameBCID(const std::uint32_t& i)const
00129 {
00130     std::uint32_t shift{+Size::MICROROC_HEADER};
00131     return GrayToBin((m_Frames[i][shift] << 16) + (m_Frames[i][shift + 1] << 8) + m_Frames[i][shift + 2]);
00132 }
00133
00134 inline std::uint32_t Payload150::getFrameTimeToTrigger(const std::uint32_t& i)const { return getBCID()
- getFrameBCID(i); }
00135
00136 Payload150::~Payload150() {}

```

## 5.55 libs/core/src/RawBufferNavigator.cc File Reference

```
#include "RawBufferNavigator.h"
```

### 5.55.1 Detailed Description

#### Copyright

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Definition in file [RawBufferNavigator.cc](#).

## 5.56 RawBufferNavigator.cc

[Go to the documentation of this file.](#)

```
00001
00005 #include "RawBufferNavigator.h"
00006
00007 std::int32_t RawBufferNavigator::m_StartPayload{20};
00008
00009 void RawBufferNavigator::startAt(const int& start)
00010 {
00011     if(start >= 0) m_StartPayload = start;
00012 }
00013
00014 RawBufferNavigator::RawBufferNavigator() {}
00015
00016 void RawBufferNavigator::setBuffer(const Buffer& b) { m_Buffer = b; }
00017
00018 std::uint32_t RawBufferNavigator::getDetectorID() { return m_Buffer[0]; }
00019
00020 std::int32_t RawBufferNavigator::getStartOfPayload() { return m_StartPayload; }
00021
00022 Buffer RawBufferNavigator::getPayload() { return Buffer(&m_Buffer.begin()[m_StartPayload],
    m_Buffer.size() - m_StartPayload); }
```

## 5.57 libs/core/src/Version.cc File Reference

```
#include "Version.h"
```

### 5.57.1 Detailed Description

#### Copyright

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Definition in file [Version.cc](#).

## 5.58 Version.cc

[Go to the documentation of this file.](#)

```

00001
00005 #include "Version.h"
00006
00007 const static Version streamout_version;
00008
00009 std::uint8_t Version::getMajor() { return major; }
00010
00011 std::uint8_t Version::getMinor() { return minor; }
00012
00013 std::uint8_t Version::getPatch() { return patch; }
00014
00015 std::string Version::getPreRelease()
00016 {
00017     switch(prerelease_type)
00018     {
00019         case semver::prerelease::alpha: return "alpha";
00020         case semver::prerelease::beta:  return "beta";
00021         case semver::prerelease::rc:    return "rc";
00022         case semver::prerelease::none:  return "";
00023         default: return "";
00024     }
00025 }
00026
00027 std::uint8_t Version::getPreReleaseNumber() { return prerelease_number; }

```

## 5.59 libs/interface/Dump/include/textDump.h File Reference

```

#include "Interface.h"
#include "Payload.h"
#include "spdlog/sinks/stdout_color_sinks.h"
#include <memory>
#include <spdlog/logger.h>

```

### Classes

- class [textDump](#)

### 5.59.1 Detailed Description

#### Copyright

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Definition in file [textDump.h](#).

## 5.60 textDump.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006
00007 #include "Interface.h"
00008 #include "Payload.h"
00009 #include "spdlog/sinks/stdout_color_sinks.h"
00010
00011 #include <memory>
00012 #include <spdlog/logger.h>
00013

```

```

00014 class textDump : public InterfaceWriter
00015 {
00016 public:
00017     textDump();
00018     void                start(const VersionInfos& ver) final;
00019     void                processDIF(const Payload&);
00020     void                processFrame(const Payload&, uint32_t frameIndex);
00021     void                processPadInFrame(const Payload&, uint32_t frameIndex, uint32_t
channelIndex);
00022     void                processSlowControl(Buffer);
00023     void                end();
00024     std::shared_ptr<spdlog::logger>& print() { return m_InternalLogger; }
00025     void                setLevel(const spdlog::level::level_enum& level) {
m_InternalLogger->set_level(level); }
00026
00027 private:
00028     // This class is a dumb class to print on terminal so we need the logger + the standard one given by
the interface.
00029     std::shared_ptr<spdlog::logger> m_InternalLogger{nullptr};
00030 };

```

## 5.61 libs/interface/Dump/src/textDump.cc File Reference

```
#include "textDump.h"
```

### 5.61.1 Detailed Description

#### Copyright

2022 G.Grenier F.Lagarde

Definition in file [textDump.cc](#).

## 5.62 textDump.cc

[Go to the documentation of this file.](#)

```

00001
00005 #include "textDump.h"
00006
00007 textDump::textDump() : InterfaceWriter("textDump", "1.0.0")
00008 {
00009     m_InternalLogger = std::make_shared<spdlog::logger>("textDump",
std::make_shared<spdlog::sinks::stdout_color_sink_mt>());
00010     m_InternalLogger->set_level(spdlog::level::trace);
00011     addCompatibility("RawdataReader", ">=1.0.0");
00012     addCompatibility("DIFdataExample", ">=1.0.0");
00013 }
00014
00015 void textDump::start(const VersionInfos& ver) { print()->info("Will dump bunch of DIF data"); }
00016
00017 void textDump::processDIF(const Payload& d) { print()->info("DIF_ID : {}, DTC : {}, GTC : {}, DIF BCID
{}, Absolute BCID : {}, Nbr frames {}", d.getDIFid(), d.getDTC(), d.getGTC(), d.getBCID(),
d.getAbsoluteBCID(), d.getNumberOfFrames()); }
00018
00019 void textDump::processFrame(const Payload& d, uint32_t frameIndex)
00020 {
00021     print()->info("\tDisplaying frame number {} : ASIC ID {}, Frame BCID {}, Frame Time To Trigger
(a.k.a timestamp) is {}", frameIndex, d.getASICid(frameIndex), d.getFrameBCID(frameIndex),
d.getFrameTimeToTrigger(frameIndex));
00022 }
00023
00024 void textDump::processPadInFrame(const Payload& d, uint32_t frameIndex, uint32_t channelIndex)
00025 {
00026     if(d.getThresholdStatus(frameIndex, channelIndex) > 0) { print()->info("\t\tChannel {}, Threshold
{}", channelIndex, d.getThresholdStatus(frameIndex, channelIndex)); }
00027 }
00028
00029 void textDump::processSlowControl(Buffer) { print()->error("textDump::processSlowControl not
implemented yet."); }
00030
00031 void textDump::end() { print()->info("textDump end of report"); }

```

## 5.63 libs/interface/LCIO/include/LCIOWriter.h File Reference

```
#include "EVENT/LCIO.h"
#include "IMPL/LCCollectionVec.h"
#include "IMPL/LCEventImpl.h"
#include "IMPL/RawCalorimeterHitImpl.h"
#include "IO/LCWriter.h"
#include "Interface.h"
#include "Payload.h"
#include <memory>
#include <string>
#include <vector>
```

### Classes

- class [LCIOWriter](#)

### 5.63.1 Detailed Description

#### Copyright

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Definition in file [LCIOWriter.h](#).

## 5.64 LCIOWriter.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include "EVENT/LCIO.h"
00008 #include "IMPL/LCCollectionVec.h"
00009 #include "IMPL/LCEventImpl.h"
00010 #include "IMPL/RawCalorimeterHitImpl.h"
00011 #include "IO/LCWriter.h"
00012 #include "Interface.h"
00013 #include "Payload.h"
00014
00015 #include <memory>
00016 #include <string>
00017 #include <vector>
00018
00019 class LCIOWriter : public InterfaceWriter
00020 {
00021 public:
00022     LCIOWriter();
00023
00024     void setFilename(const std::string&);
00025
00026     void start(const VersionInfos& ver) final;
00027     void processDIF(const Payload&);
00028     void processFrame(const Payload&, const std::uint32_t& frameIndex);
00029     void processPadInFrame(const Payload&, const std::uint32_t& frameIndex, const std::uint32_t&
channelIndex);
00030     void processSlowControl(const Buffer&) { ; }
00031     void end();
00032
00033     virtual void startEvent();
00034     virtual void endEvent();
00035     virtual void startDIF();
00036     virtual void endDIF();
00037     virtual void startFrame();
00038     virtual void endFrame();
```

```

00039     virtual void startPad();
00040     virtual void endPad();
00041
00042 private:
00043     std::unique_ptr<IO::LCWriter> m_LCWriter{nullptr};
00044     std::unique_ptr<IMPL::LCEventImpl> m_LCEvent{nullptr};
00045     IMPL::LCCollectionVec* m_CollectionVec{nullptr};
00046     std::string m_DetectorName{"SDHCAL_prototype"};
00047     std::string m_Filename;
00048 };

```

## 5.65 libs/interface/LCIO/src/LCIOWriter.cc File Reference

```

#include "LCIOWriter.h"
#include "Filesystem.h"
#include "IMPL/LCFlagImpl.h"
#include "IMPL/LCParametersImpl.h"
#include "IMPL/LCRunHeaderImpl.h"
#include "IOIMPL/LCFactory.h"
#include "LCIOSTLTypes.h"

```

### 5.65.1 Detailed Description

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Definition in file [LCIOWriter.cc](#).

## 5.66 LCIOWriter.cc

[Go to the documentation of this file.](#)

```

00001
00009 #include "LCIOWriter.h"
00010
00011 #include "Filesystem.h"
00012 #include "IMPL/LCFlagImpl.h"
00013 #include "IMPL/LCParametersImpl.h"
00014 #include "IMPL/LCRunHeaderImpl.h"
00015 #include "IOIMPL/LCFactory.h"
00016 #include "LCIOSTLTypes.h"
00017
00018 void LCIOWriter::setFilename(const std::string& filename) { m_Filename = filename; }
00019
00020 LCIOWriter::LCIOWriter() : InterfaceWriter("LCIOWriter", "1.0.0"),
    m_LCWriter(IOIMPL::LCFactory::getInstance()->createLCWriter()) { addCompatibility("RawDataReader",
    ">=1.0.0"); }
00021
00022 void LCIOWriter::start(const VersionInfos& ver)
00023 {
00024     m_LCWriter->open(m_Filename, EVENT::LCIO::WRITE_NEW);
00025     std::unique_ptr<IMPL::LCRunHeaderImpl> runHdr(new IMPL::LCRunHeaderImpl);
00026     std::string filename_ = filename(m_Filename);
00027     std::size_t begin_ = filename_.find_last_of("_R");
00028     if(begin_ == std::string::npos) begin_ = filename_.find_last_of('_');
00029     filename_ = filename_.substr(begin_ + 1);
00030     setRunNumber(stoi(filename_));
00031     runHdr->setRunNumber(getRunNumber());
00032     runHdr->setDetectorName(m_DetectorName);
00033     std::string description("data collected with SDHCAL prototype");
00034     runHdr->setDescription(description);
00035     runHdr->parameters().setValue("Library_Name", ver.getLibraryInfos().first);
00036     runHdr->parameters().setValue("Library_Version", ver.getLibraryInfos().second.to_string());
00037     runHdr->parameters().setValue("Reader_Name", ver.getReaderInfos().first);
00038     runHdr->parameters().setValue("Reader_Version", ver.getReaderInfos().second.to_string());
00039     runHdr->parameters().setValue("Writer_Name", ver.getWriterInfos().first);

```

```

00040 runHdr->parameters().setValue("Writer_Version", ver.getWriterInfos().second.toString());
00041 m_LCWriter->writeRunHeader(runHdr.get());
00042 }
00043
00044 void LCIOWriter::end() { m_LCWriter->close(); }
00045
00046 void LCIOWriter::processDIF(const Payload& d)
00047 {
00048     std::string parameter_name = "DIF" + std::to_string(d.getDIFid()) + "_Triggers";
00049     EVENT::IntVec parameters;
00050     parameters.push_back(d.getDTC());
00051     parameters.push_back(d.getGTC());
00052     parameters.push_back(d.getBCID());
00053     parameters.push_back(d.getAbsoluteBCID() & 0xFFFFF);
00054     parameters.push_back((d.getAbsoluteBCID() >> 24) & 0xFFFFF);
00055     parameters.push_back(0);
00056     parameters.push_back(0);
00057     parameters.push_back(0);
00058     m_CollectionVec->parameters().setValues("DIF" + std::to_string(d.getDIFid()) + "_Triggers",
parameters);
00059     parameter_name = "DIF_DetectorID_" + std::to_string(d.getDIFid());
00060     m_CollectionVec->parameters().setValue(parameter_name, static_cast<int>(d.getDetectorID()));
00061 }
00062
00063 void LCIOWriter::processFrame(const Payload& d, const std::uint32_t& frameIndex) {}
00064
00065 void LCIOWriter::processPadInFrame(const Payload& d, const std::uint32_t& frameIndex, const
std::uint32_t& channelIndex)
00066 {
00067     m_LCEvent->setTimeStamp(d.getAbsoluteBCID() * 200);
00068     m_LCEvent->setRunNumber(getRunNumber());
00069     IMPL::RawCalorimeterHitImpl* hit = new IMPL::RawCalorimeterHitImpl;
00070     int ID0 = channelIndex;
00071     ID0 = ID0 << 8;
00072     ID0 += d.getASICid(frameIndex);
00073     ID0 = ID0 << 8;
00074     ID0 += d.getDIFid();
00075     hit->setCellID0(ID0);
00076     hit->setCellID1(d.getFrameBCID(frameIndex));
00077     hit->setAmplitude(d.getThresholdStatus(frameIndex, channelIndex));
00078     hit->setTimeStamp(d.getFrameTimeToTrigger(frameIndex));
00079     m_CollectionVec->addElement(hit);
00080 }
00081
00082 void LCIOWriter::startEvent()
00083 {
00084     m_LCEvent = std::make_unique<IMPL::LCEventImpl>();
00085     m_LCEvent->setEventNumber(getEventNumber());
00086     m_LCEvent->setDetectorName(m_DetectorName);
00087     m_LCEvent->setWeight(1);
00088     m_CollectionVec = new IMPL::LCCollectionVec(EVENT::LCIO::RAWCALORIMETERHIT);
00089     IMPL::LCFlagImpl flag(0);
00090     flag.setBit(EVENT::LCIO::RCHBIT_ID1);
00091     flag.setBit(EVENT::LCIO::RCHBIT_TIME);
00092     m_CollectionVec->setFlag(flag.getFlag());
00093     m_CollectionVec->parameters().setValue(EVENT::LCIO::CellIDEncoding, "dif:8,asic:8,channel:6");
00094 }
00095
00096 void LCIOWriter::endEvent()
00097 {
00098     m_LCEvent->addCollection(m_CollectionVec, "DHCALRawHits");
00099     m_LCWriter->writeEvent(m_LCEvent.get());
00100 }
00101
00102 void LCIOWriter::startDIF() {}
00103
00104 void LCIOWriter::endDIF() {}
00105
00106 void LCIOWriter::startFrame() {}
00107
00108 void LCIOWriter::endFrame() {}
00109
00110 void LCIOWriter::startPad() {}
00111
00112 void LCIOWriter::endPad() {}

```

## 5.67 libs/interface/RawDataReader/include/RawDataReader.h File Reference

```

#include "Interface.h"
#include <array>
#include <cstdint>

```

```
#include <fstream>
#include <string>
#include <vector>
```

## Classes

- class [RawdataReader](#)

### 5.67.1 Detailed Description

#### Copyright

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Definition in file [RawdataReader.h](#).

## 5.68 RawdataReader.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include "Interface.h"
00008
00009 #include <array>
00010 #include <cstdint>
00011 #include <fstream>
00012 #include <string>
00013 #include <vector>
00014
00015 class Buffer;
00016
00017 class RawdataReader : public InterfaceReader
00018 {
00019 public:
00020     explicit RawdataReader(const char* fileName);
00021     void start(const VersionInfos& ver) final;
00022     void end();
00023     float getFileSize();
00024     void openFile(const std::string& fileName);
00025     void closeFile();
00026     bool nextEvent();
00027     bool nextDIFbuffer();
00028     const Buffer& getBuffer();
00029     virtual ~RawdataReader() { closeFile(); }
00030     static void setDefaultBufferSize(const std::size_t& size);
00031
00032 private:
00033     void uncompress();
00034     std::ifstream m_FileStream;
00035     void setFileSize(const std::size_t& size);
00036     static std::size_t m_BufferSize;
00037     std::size_t m_FileSize{0};
00038     std::uint32_t m_NumberOfDIF{0};
00039     std::vector<bit8_t> m_buf;
00040     std::string m_Filename;
00041 };
```

### 5.69 libs/interface/RawDataReader/src/RawdataReader.cc File Reference

```
#include "RawdataReader.h"
#include "Exception.h"
#include <cstring>
#include <stdexcept>
#include <zlib.h>
```



## 5.69.1 Detailed Description

### Copyright

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Definition in file [RawdataReader.cc](#).

## 5.70 RawdataReader.cc

[Go to the documentation of this file.](#)

```

00001
00004 #include "RawdataReader.h"
00005
00006 #include "Exception.h"
00007
00008 #include <cstring>
00009 #include <stdexcept>
00010 #include <zlib.h>
00011
00013 std::size_t RawdataReader::m_BufferSize = 0x100000;
00014
00015 void RawdataReader::setDefaultBufferSize(const std::size_t& size) { m_BufferSize = size; }
00016
00017 RawdataReader::RawdataReader(const char* fileName) : InterfaceReader("RawdataReader", "1.0.0")
00018 {
00019     m_buf.reserve(m_BufferSize);
00020     m_Filename = fileName;
00021 }
00022
00023 void RawdataReader::start(const VersionInfos& ver) { openFile(m_Filename); }
00024
00025 void RawdataReader::end() { closeFile(); }
00026
00027 void RawdataReader::uncompress()
00028 {
00029     static const std::size_t size_buffer{0x20000};
00030     std::size_t shift{3 * sizeof(std::uint32_t) + sizeof(std::uint64_t)};
00031     static bit8_t obuf[size_buffer];
00032     unsigned long size_buffer_end{0x20000}; // NOLINT(runtime/int)
00033     std::int8_t rc = ::uncompress(obuf, &size_buffer_end, &m_Buffer[shift], m_Buffer.size()
- shift);
00034     switch(rc)
00035     {
00036         case Z_OK: break;
00037         case Z_MEM_ERROR: throw Exception(Z_MEM_ERROR, "Not enough memory"); break;
00038         case Z_BUF_ERROR: throw Exception(Z_BUF_ERROR, "Not enough room in the output buffer"); break;
00039         case Z_DATA_ERROR: throw Exception(Z_DATA_ERROR, "The input data was corrupted or incomplete");
break;
00040         default: throw Exception("The input data was corrupted or incomplete"); break;
00041     }
00042     memcpy(&m_Buffer[shift], obuf, size_buffer_end);
00043     m_Buffer.setSize(size_buffer_end + shift);
00044 }
00045
00046 void RawdataReader::closeFile()
00047 {
00048     try
00049     {
00050         if(m_FileStream.is_open()) m_FileStream.close();
00051     }
00052     catch(const std::ios_base::failure& e)
00053     {
00054         log()->error("Caught an ios_base::failure in closeFile : {} {}", e.what(), e.code().value());
00055         throw;
00056     }
00057 }
00058
00059 void RawdataReader::openFile(const std::string& fileName)
00060 {
00061     try
00062     {
00063         m_FileStream.rdbuf()->pubsetbuf(0, 0);
00064         m_FileStream.exceptions(std::ifstream::failbit | std::ifstream::badbit);
00065         m_FileStream.open(fileName.c_str(), std::ios::in | std::ios::binary | std::ios::ate); // Start at
the end to directly calculate the size of the file then come back to beginning
00066         m_FileStream.rdbuf()->pubsetbuf(0, 0);
00067         if(m_FileStream.is_open())

```

```

00068     {
00069         setFileSize(m_FileStream.tellg());
00070         m_FileStream.seekg(0, std::ios::beg);
00071     }
00072 }
00073 catch(const std::ios_base::failure& e)
00074 {
00075     log()->error("Caught an ios_base::failure in openFile : {}", e.what());
00076     throw;
00077 }
00078 }
00079
00080 bool RawdataReader::nextEvent()
00081 {
00082     try
00083     {
00084         m_FileStream.read(reinterpret_cast<char*>(&m_EventNumber), sizeof(std::uint32_t));
00085         m_FileStream.read(reinterpret_cast<char*>(&m_NumberOfDIF), sizeof(std::uint32_t));
00086     }
00087     catch(const std::ios_base::failure& e)
00088     {
00089         return false;
00090     }
00091     return true;
00092 }
00093
00094 bool RawdataReader::nextDIFbuffer()
00095 {
00096     try
00097     {
00098         static int DIF_processed{0};
00099         if(DIF_processed >= m_NumberOfDIF)
00100         {
00101             DIF_processed = 0;
00102             return false;
00103         }
00104         else
00105         {
00106             DIF_processed++;
00107             std::uint32_t bsize{0};
00108             m_FileStream.read(reinterpret_cast<char*>(&bsize), sizeof(std::uint32_t));
00109             m_FileStream.read(reinterpret_cast<char*>(&m_buf[0]), bsize);
00110             m_Buffer = Buffer(m_buf);
00111         }
00112     }
00113     catch(const std::ios_base::failure& e)
00114     {
00115         log()->error("Caught an ios_base::failure in openFile : {}", e.what());
00116         return false;
00117     }
00118     return true;
00119 }
00120
00121 const Buffer& RawdataReader::getBuffer()
00122 {
00123     uncompress();
00124     return m_Buffer;
00125 }
00126
00127 void RawdataReader::setFileSize(const std::size_t& size) { m_FileSize = size; }
00128
00129 float RawdataReader::getFileSize() { return m_FileSize; }

```

## 5.71 libs/interface/ROOT/include/DIF.h File Reference

```

#include "Hit.h"
#include <TObject.h>
#include <cstdint>
#include <map>
#include <vector>

```

### Classes

- class [DIF](#)

## Typedefs

- using `Hits_const_iterator` = `std::vector< Hit >::const_iterator`

### 5.71.1 Detailed Description

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Definition in file [DIF.h](#).

### 5.71.2 Typedef Documentation

#### 5.71.2.1 Hits\_const\_iterator

using `Hits_const_iterator` = `std::vector<Hit>::const_iterator`

Definition at line 14 of file [DIF.h](#).

## 5.72 DIF.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006
00007 #include "Hit.h"
00008
00009 #include <TObject.h>
00010 #include <cstdint>
00011 #include <map>
00012 #include <vector>
00013
00014 using Hits_const_iterator = std::vector<Hit>::const_iterator;
00015
00016 class DIF : public TObject
00017 {
00018 public:
00019     void                clear();
00020     void                addHit(const Hit&);
00021     void                setID(const std::uint8_t&);
00022     std::uint8_t        getID() const;
00023     void                setDTC(const std::uint32_t&);
00024     std::uint32_t        getDTC() const;
00025     void                setDetectorID(const std::uint32_t&);
00026     std::uint8_t        getDetectorID() const;
00027     void                setGTC(const std::uint32_t&);
00028     std::uint32_t        getGTC() const;
00029     void                setDIFBCID(const std::uint32_t&);
00030     std::uint32_t        getDIFBCID() const;
00031     void                setAbsoluteBCID(const std::uint64_t&);
00032     std::uint64_t        getAbsoluteBCID() const;
00033     std::vector<Hit>::const_iterator cbegin() const;
00034     std::vector<Hit>::const_iterator cend() const;
00035
00036 private:
00037     std::uint8_t        m_DetectorID{0};
00038     std::uint8_t        m_ID{0};
00039     std::uint32_t        m_DTC{0};
00040     std::uint32_t        m_GTC{0};
00041     std::uint32_t        m_DIFBCID{0};
00042     std::uint64_t        m_AbsoluteBCID{0};
00043     std::vector<Hit>    m_Hits;
00044     ClassDef(DIF, 1);
00045 };

```

## 5.73 libs/interface/ROOT/include/DIFLinkDef.h File Reference

```
#include <vector>
```

### 5.73.1 Detailed Description

#### Copyright

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Definition in file [DIFLinkDef.h](#).

## 5.74 DIFLinkDef.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006 #include <vector>
00007
00008 #ifndef __CLING__
00009 #pragma link C++ class DIF;
00010 #pragma link C++ class Hit;
00011 #pragma link C++ class std::vector < Hit>;
00012 #endif
```

## 5.75 libs/interface/ROOT/include/Event.h File Reference

```
#include "DIF.h"
#include <TObject.h>
#include <cstdint>
#include <map>
```

#### Classes

- class [Event](#)

#### Typedefs

- using [DIFs\\_const\\_iterator](#) = std::map< std::uint8\_t, [DIF](#) >::const\_iterator

### 5.75.1 Detailed Description

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Definition in file [Event.h](#).

## 5.75.2 Typedef Documentation

**5.75.2.1 DIFs\_const\_iterator** using `DIFs_const_iterator = std::map<std::uint8_t, DIF>::const_iterator`

Definition at line 13 of file [Event.h](#).

## 5.76 Event.h

[Go to the documentation of this file.](#)

```

00001
00005 #pragma once
00006
00007 #include "DIF.h"
00008
00009 #include <TObject.h>
00010 #include <cstdint>
00011 #include <map>
00012
00013 using DIFs_const_iterator = std::map<std::uint8_t, DIF>::const_iterator;
00014
00015 class Event : public TObject
00016 {
00017 public:
00018     std::uint32_t                getEventNumber();
00019     void                        setEventNumber(const std::uint32_t& evtNbr);
00020     void                        clear();
00021     void                        addDIF(const DIF& dif);
00022     std::map<std::uint8_t, DIF>::const_iterator cbegin() const;
00023     std::map<std::uint8_t, DIF>::const_iterator cend() const;
00024
00025 private:
00026     std::uint32_t                m_EventNumber{0};
00027     std::map<std::uint8_t, DIF> DIFs;
00028     ClassDef(Event, 1);
00029 };

```

## 5.77 libs/interface/ROOT/include/EventLinkDef.h File Reference

```

#include <cstdint>
#include <map>
#include <vector>

```

### 5.77.1 Detailed Description

#### Copyright

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Definition in file [EventLinkDef.h](#).

## 5.78 EventLinkDef.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006 #include <cstdint>
00007 #include <map>
00008 #include <vector>
00009 #ifdef __CLING__
00010 #pragma link C++ class DIF;
00011 #pragma link C++ class std::vector < DIF>;
00012 #pragma link C++ class Hit;
00013 #pragma link C++ class std::vector < Hit>;
00014 #pragma link C++ class Event;
00015 #pragma link C++ class std::vector < Event>;
00016 #pragma link C++ class std::map < std::uint8_t, DIF>;
00017 #endif
```

## 5.79 libs/interface/ROOT/include/Hit.h File Reference

```
#include <TObject.h>
#include <cstdint>
```

### Classes

- class [Hit](#)

### 5.79.1 Detailed Description

#### Copyright

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Definition in file [Hit.h](#).

## 5.80 Hit.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006
00007 #include <TObject.h>
00008 #include <cstdint>
00009
00010 class Hit : public TObject
00011 {
00012 public:
00013     void clear();
00014     void setDIF(const std::uint8_t&);
00015     void setASIC(const std::uint8_t&);
00016     void setChannel(const std::uint8_t&);
00017     void setThreshold(const std::uint8_t&);
00018     void setDTC(const std::uint32_t&);
00019     void setGTC(const std::uint32_t&);
00020     void setDIFBCID(const std::uint32_t&);
00021     void setFrameBCID(const std::uint32_t&);
00022     void setTimestamp(const std::uint32_t&);
00023     void setAbsoluteBCID(const std::uint64_t&);
00024     std::uint8_t getDIFid() const;
00025     std::uint8_t getASICid() const;
00026     std::uint8_t getChannel() const;
00027     std::uint8_t getThreshold() const;
00028     std::uint32_t getDTC() const;
```

```
00029 std::uint32_t getGTC() const;
00030 std::uint32_t getDIFBCID() const;
00031 std::uint32_t getFrameBCID() const;
00032 std::uint32_t getTimestamp() const;
00033 std::uint64_t getAbsoluteBCID() const;
00034
00035 private:
00036 std::uint8_t m_DIF{0};
00037 std::uint8_t m_ASIC{0};
00038 std::uint8_t m_Channel{0};
00039 std::uint8_t m_Threshold{0};
00040 std::uint32_t m_DTC{0};
00041 std::uint32_t m_GTC{0};
00042 std::uint32_t m_DIFBCID{0};
00043 std::uint32_t m_FrameBCID{0};
00044 std::uint32_t m_Timestamp{0};
00045 std::uint64_t m_AbsoluteBCID{0};
00046 ClassDef(Hit, 1);
00047 };
```

## 5.81 libs/interface/ROOT/include/HitLinkDef.h File Reference

### 5.81.1 Detailed Description

#### Copyright

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Definition in file [HitLinkDef.h](#).

## 5.82 HitLinkDef.h

[Go to the documentation of this file.](#)

```
00001
00005 #pragma once
00006 #ifndef __CLING__
00007 #pragma link C++ class Hit;
00008 #endif
```

## 5.83 libs/interface/ROOT/include/ROOTWriter.h File Reference

```
#include "Event.h"
#include "Interface.h"
#include "Payload.h"
#include <TFile.h>
#include <TTree.h>
#include <string>
#include <vector>
```

#### Classes

- class [ROOTWriter](#)

## 5.84 ROOTWriter.h

[Go to the documentation of this file.](#)

```
00001
00006 #pragma once
00007
00008 #include "Event.h"
00009 #include "Interface.h"
00010 #include "Payload.h"
00011
00012 #include <TFile.h>
00013 #include <TTree.h>
00014 #include <string>
00015 #include <vector>
00016
00017 class ROOTWriter : public InterfaceWriter
00018 {
00019 public:
00020     ROOTWriter();
00021
00022     void setFilename(const std::string&);
00023
00024     void start(const VersionInfos& ver);
00025     void processDIF(const Payload&);
00026     void processFrame(const Payload&, const std::uint32_t& frameIndex);
00027     void processPadInFrame(const Payload&, const std::uint32_t& frameIndex, const std::uint32_t&
channelIndex);
00028     void processSlowControl(const Buffer&) { ; }
00029     void end();
00030
00031     virtual void startEvent();
00032     virtual void endEvent();
00033     virtual void startDIF();
00034     virtual void endDIF();
00035     virtual void startFrame();
00036     virtual void endFrame();
00037     virtual void startPad();
00038     virtual void endPad();
00039
00040 private:
00041     TFile*      m_File{nullptr};
00042     TTree*      m_Tree{nullptr};
00043     Event*      m_Event{nullptr};
00044     DIF*        m_DIF{nullptr};
00045     Hit*        m_Hit{nullptr};
00046     std::string m_Filename;
00047 };
```

## 5.85 libs/interface/ROOT/src/DIF.cc File Reference

```
#include "DIF.h"
#include <cstdint>
```

### 5.85.1 Detailed Description

#### Copyright

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Definition in file [DIF.cc](#).



## 5.86 DIF.cc

[Go to the documentation of this file.](#)

```

00001
00006 #include "DIF.h"
00007
00008 #include <cstdint>
00009
00010 void DIF::addHit(const Hit& hit) { m_Hits.push_back(hit); }
00011
00012 void DIF::setID(const std::uint8_t& id) { m_ID = id; }
00013
00014 std::uint8_t DIF::getID()const { return m_ID; }
00015
00016 void DIF::setDTC(const std::uint32_t& dtc) { m_DTC = dtc; }
00017
00018 std::uint32_t DIF::getDTC()const { return m_DTC; }
00019
00020 void DIF::setGTC(const std::uint32_t& gtc) { m_GTC = gtc; }
00021
00022 std::uint32_t DIF::getGTC()const { return m_GTC; }
00023
00024 void DIF::setDIFBCID(const std::uint32_t& difbcid) { m_DIFBCID = difbcid; }
00025
00026 std::uint32_t DIF::getDIFBCID()const { return m_DIFBCID; }
00027
00028 void DIF::setAbsoluteBCID(const std::uint64_t& absolutebcid) { m_AbsoluteBCID = absolutebcid; }
00029
00030 std::uint64_t DIF::getAbsoluteBCID()const { return m_AbsoluteBCID; }
00031
00032 std::vector<Hit>::const_iterator DIF::cbegin()const { return m_Hits.cbegin(); }
00033
00034 std::vector<Hit>::const_iterator DIF::cend()const { return m_Hits.cend(); }
00035
00036 void DIF::clear() { m_Hits.clear(); }
00037
00038 void DIF::setDetectorID(const std::uint32_t& detector_id) { m_DetectorID = detector_id; }
00039
00040 std::uint8_t DIF::getDetectorID()const { return m_DetectorID; }

```

## 5.87 libs/interface/ROOT/src/Event.cc File Reference

```
#include "Event.h"
```

### 5.87.1 Detailed Description

#### Copyright

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Definition in file [Event.cc](#).

## 5.88 Event.cc

[Go to the documentation of this file.](#)

```

00001
00006 #include "Event.h"
00007
00008 std::uint32_t Event::getEventNumber() { return m_EventNumber; }
00009
00010 void Event::setEventNumber(const std::uint32_t& evtNbr) { m_EventNumber = evtNbr; }
00011
00012 void Event::clear() { DIFs.clear(); }
00013
00014 void Event::addDIF(const DIF& dif) { DIFs[dif.getID()] = dif; }
00015
00016 std::map<std::uint8_t, DIF>::const_iterator Event::cbegin()const { return DIFs.cbegin(); }
00017
00018 std::map<std::uint8_t, DIF>::const_iterator Event::cend()const { return DIFs.cend(); }

```

## 5.89 libs/interface/ROOT/src/Hit.cc File Reference

```
#include "Hit.h"
```

### 5.89.1 Detailed Description

#### Copyright

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Definition in file [Hit.cc](#).

## 5.90 Hit.cc

[Go to the documentation of this file.](#)

```
00001
00006 #include "Hit.h"
00007 void Hit::clear()
00008 {
00009     m_DIF          = 0;
00010     m_ASIC         = 0;
00011     m_Channel      = 0;
00012     m_Threshold    = 0;
00013     m_DTC          = 0;
00014     m_GTC          = 0;
00015     m_DIFBCID     = 0;
00016     m_FrameBCID   = 0;
00017     m_Timestamp    = 0;
00018     m_AbsoluteBCID = 0;
00019 }
00020
00021 void Hit::setDIF(const std::uint8_t& dif) { m_DIF = dif; }
00022
00023 void Hit::setASIC(const std::uint8_t& asic) { m_ASIC = asic; }
00024
00025 void Hit::setChannel(const std::uint8_t& channel) { m_Channel = channel; }
00026
00027 void Hit::setThreshold(const std::uint8_t& threshold) { m_Threshold = threshold; }
00028
00029 void Hit::setDTC(const std::uint32_t& dtc) { m_DTC = dtc; }
00030
00031 void Hit::setGTC(const std::uint32_t& gtc) { m_GTC = gtc; }
00032
00033 void Hit::setDIFBCID(const std::uint32_t& difbcid) { m_DIFBCID = difbcid; }
00034
00035 void Hit::setFrameBCID(const std::uint32_t& framebcid) { m_FrameBCID = framebcid; }
00036
00037 void Hit::setTimestamp(const std::uint32_t& timestamp) { m_Timestamp = timestamp; }
00038
00039 void Hit::setAbsoluteBCID(const std::uint64_t& absolutebcid) { m_AbsoluteBCID = absolutebcid; }
00040
00041 std::uint8_t Hit::getDIFid()const { return m_DIF; }
00042
00043 std::uint8_t Hit::getASICid()const { return m_ASIC; }
00044
00045 std::uint8_t Hit::getChannel()const { return m_Channel; }
00046
00047 std::uint8_t Hit::getThreshold()const { return m_Threshold; }
00048
00049 std::uint32_t Hit::getDTC()const { return m_DTC; }
00050
00051 std::uint32_t Hit::getGTC()const { return m_GTC; }
00052
00053 std::uint32_t Hit::getDIFBCID()const { return m_DIFBCID; }
00054
00055 std::uint32_t Hit::getFrameBCID()const { return m_FrameBCID; }
00056
00057 std::uint32_t Hit::getTimestamp()const { return m_Timestamp; }
00058
00059 std::uint64_t Hit::getAbsoluteBCID()const { return m_AbsoluteBCID; }
```

## 5.91 libs/interface/ROOT/src/ROOTWriter.cc File Reference

```
#include "ROOTWriter.h"
```

### 5.91.1 Detailed Description

#### Copyright

2022 G.Grenier F.Lagarde

Definition in file [ROOTWriter.cc](#).

## 5.92 ROOTWriter.cc

[Go to the documentation of this file.](#)

```
00001
00006 #include "ROOTWriter.h"
00007
00008 void ROOTWriter::setFilename(const std::string& filename) { m_FileName = filename; }
00009
00010 ROOTWriter::ROOTWriter() : InterfaceWriter("ROOTWriter", "1.0.0") { addCompatibility("RawdataReader",
    ">=1.0.0"); }
00011
00012 void ROOTWriter::start(const VersionInfos& ver)
00013 {
00014     m_File = TFile::Open(m_FileName.c_str(), "RECREATE", m_FileName.c_str(),
    ROOT::CompressionSettings(ROOT::kZLIB, 5));
00015     m_Tree = new TTree("RawData", "Raw SDHCAL data tree");
00016     m_Tree->Branch("Events", &m_Event, 512000, 99);
00017 }
00018
00019 void ROOTWriter::end()
00020 {
00021     if(m_Tree) m_Tree->Write();
00022     if(m_File)
00023     {
00024         m_File->Write();
00025         m_File->Close();
00026     }
00027     if(m_File) delete m_File;
00028 }
00029
00030 void ROOTWriter::processDIF(const Payload& d)
00031 {
00032     m_DIF->setDetectorID(d.getDetectorID());
00033     m_DIF->setID(d.getDIFid());
00034     m_DIF->setDTC(d.getDTC());
00035     m_DIF->setGTC(d.getGTC());
00036     m_DIF->setDIFBCID(d.getBCID());
00037     m_DIF->setAbsoluteBCID(d.getAbsoluteBCID());
00038 }
00039
00040 void ROOTWriter::processFrame(const Payload& d, const std::uint32_t& frameIndex)
00041 {
00042     m_Hit->setDIF(d.getDIFid());
00043     m_Hit->setASIC(d.getASICid(frameIndex));
00044     m_Hit->setDTC(d.getDTC());
00045     m_Hit->setGTC(d.getGTC());
00046     m_Hit->setDIFBCID(d.getBCID());
00047     m_Hit->setAbsoluteBCID(d.getAbsoluteBCID());
00048     m_Hit->setFrameBCID(d.getFrameBCID(frameIndex));
00049     m_Hit->setTimestamp(d.getFrameTimeToTrigger(frameIndex));
00050 }
00051
00052 void ROOTWriter::processPadInFrame(const Payload& d, const std::uint32_t& frameIndex, const
    std::uint32_t& channelIndex)
00053 {
00054     m_Hit->setChannel(channelIndex);
00055     m_Hit->setThreshold(static_cast<std::uint8_t>(d.getThresholdStatus(frameIndex, channelIndex)));
00056 }
00057
00058 void ROOTWriter::startEvent()
```

```
00059 {
00060     m_Event = new Event();
00061     m_Event->setEventNumber(getEventNumber());
00062     // m_Event->clear();
00063 }
00064
00065 void ROOTWriter::endEvent()
00066 {
00067     m_Tree->Fill();
00068     if(m_Event) delete m_Event;
00069 }
00070
00071 void ROOTWriter::startDIF()
00072 {
00073     m_DIF = new DIF();
00074     // m_DIF->clear();
00075 }
00076
00077 void ROOTWriter::endDIF()
00078 {
00079     m_Event->addDIF(*m_DIF);
00080     delete m_DIF;
00081 }
00082
00083 void ROOTWriter::startFrame()
00084 {
00085     m_Hit = new Hit();
00086     // m_Hit->clear();
00087 }
00088
00089 void ROOTWriter::endFrame()
00090 {
00091     m_DIF->addHit(*m_Hit);
00092     delete m_Hit;
00093 }
00094
00095 void ROOTWriter::startPad() {}
00096
00097 void ROOTWriter::endPad() {}
```

