

2015 Test beam Run Control

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

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

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Chapter 2

Data Structure Index

2.1 Data Structures

Here are the data structures with brief descriptions:

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TDCCConfiguration	Setup word to be sent to the HPTDC chip	33
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Chapter 3

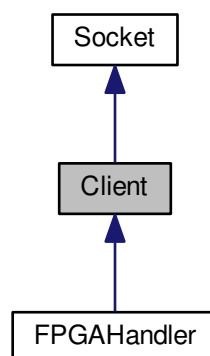
Data Structure Documentation

3.1 Client Class Reference

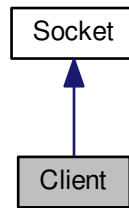
Base client object for the socket.

```
#include <Client.h>
```

Inheritance diagram for Client:



Collaboration diagram for Client:



Public Member Functions

- [Client](#) ()
General void client constructor.
- [Client](#) (int port)
Bind a socket client to a given port.
- virtual [~Client](#) ()
- bool [Connect](#) ()
Bind this client to the socket.
- void [Disconnect](#) ()
Unbind this client from the socket.
- void [Send](#) (const [Message](#) &m) const
Send a message to the master through the socket.
- void [Receive](#) ()
Receive a socket message from the master.
- virtual void [ParseMessage](#) (const [SocketMessage](#) &m)
Parse a [SocketMessage](#) received from the master.
- virtual SocketType [GetType](#) () const
[Socket](#) actor type retrieval method.

Additional Inherited Members

3.1.1 Detailed Description

Base client object for the socket.

[Client](#) object used by the server to send/receive commands from the messenger/broadcaster.

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

24 Mar 2015

3.1.2 Constructor & Destructor Documentation

3.1.2.1 `Client::Client ()` `[inline]`

General void client constructor.

3.1.2.2 `Client::Client (int port)`

Bind a socket client to a given port.

3.1.2.3 `virtual Client::~~Client ()` `[virtual]`

3.1.3 Member Function Documentation

3.1.3.1 `bool Client::Connect ()`

Bind this client to the socket.

3.1.3.2 `void Client::Disconnect ()`

Unbind this client from the socket.

3.1.3.3 `virtual SocketType Client::GetType () const` `[inline]`, `[virtual]`

[Socket](#) actor type retrieval method.

Reimplemented in [FPGAHandler](#).

3.1.3.4 `virtual void Client::ParseMessage (const SocketMessage & m)` `[inline]`, `[virtual]`

Parse a [SocketMessage](#) received from the master.

3.1.3.5 `void Client::Receive ()`

Receive a socket message from the master.

3.1.3.6 `void Client::Send (const Message & m) const` `[inline]`

Send a message to the master through the socket.

Here is the call graph for this function:



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

- `include/Client.h`

3.2 Exception Class Reference

A simple exception handler.

```
#include <Exception.h>
```

Public Member Functions

- [Exception](#) (const char *from, std::string desc, ExceptionType type=Undefined, const int id=0)
- [Exception](#) (const char *from, const char *desc, ExceptionType type=Undefined, const int id=0)
- [~Exception](#) ()
- std::string [From](#) () const
- int [ErrorNumber](#) () const
- std::string [Description](#) () const
- ExceptionType [Type](#) () const
- std::string [TypeString](#) () const
- void [Dump](#) (std::ostream &os=std::cerr) const

3.2.1 Detailed Description

A simple exception handler.

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

24 Mar 2015

3.2.2 Constructor & Destructor Documentation

3.2.2.1 `Exception::Exception (const char * from, std::string desc, ExceptionType type = Undefined, const int id = 0)`
[inline]

3.2.2.2 `Exception::Exception (const char * from, const char * desc, ExceptionType type = Undefined, const int id = 0)`
[inline]

3.2.2.3 `Exception::~~Exception ()` [inline]

Here is the call graph for this function:



3.2.3 Member Function Documentation

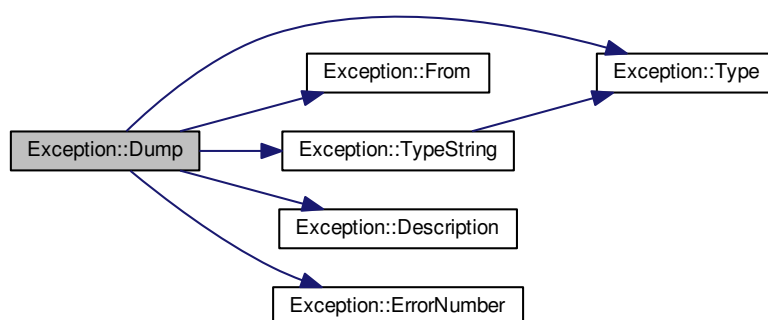
3.2.3.1 `std::string Exception::Description () const` `[inline]`

Here is the caller graph for this function:



3.2.3.2 `void Exception::Dump (std::ostream & os = std::cerr) const` `[inline]`

Here is the call graph for this function:



3.2.3.3 `int Exception::ErrorNumber () const` `[inline]`

Here is the caller graph for this function:



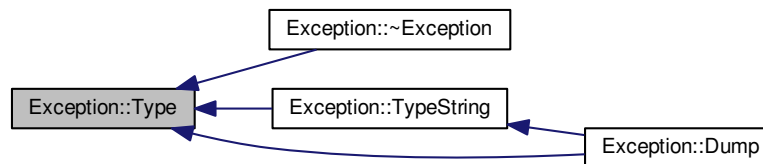
3.2.3.4 `std::string Exception::From () const` `[inline]`

Here is the caller graph for this function:



3.2.3.5 `ExceptionType Exception::Type () const` `[inline]`

Here is the caller graph for this function:



3.2.3.6 `std::string Exception::TypeString () const` `[inline]`

Here is the call graph for this function:



Here is the caller graph for this function:



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

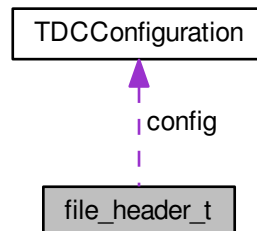
- include/Exception.h

3.3 file_header_t Struct Reference

Header to the output files.

```
#include <FPGAHandler.h>
```

Collaboration diagram for file_header_t:



Data Fields

- uint32_t [magic](#)
- uint32_t [run_id](#)
- uint32_t [spill_id](#)
- [TDCCConfiguration](#) [config](#)

3.3.1 Detailed Description

Header to the output files.

General header to store in each collected data file for offline readout. It enable any reader to retrieve the run/spill number, as well as the HPTDC configuration during data collection.

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

14 Apr 2015

3.3.2 Field Documentation

3.3.2.1 `TDCCConfiguration file_header_t::config`

3.3.2.2 `uint32_t file_header_t::magic`

3.3.2.3 `uint32_t file_header_t::run_id`

3.3.2.4 `uint32_t file_header_t::spill_id`

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

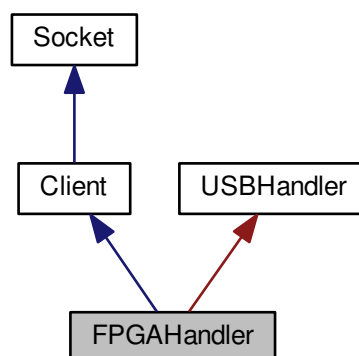
- `include/FPGAHandler.h`

3.4 FPGAHandler Class Reference

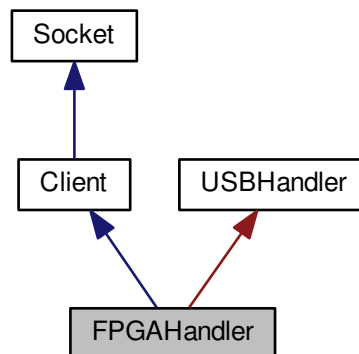
Driver for timing detectors' FPGA readout.

```
#include <FPGAHandler.h>
```

Inheritance diagram for FPGAHandler:



Collaboration diagram for FPGAHandler:



Public Member Functions

- [FPGAHandler](#) (int port, const char *dev)
Bind to a FPGA through the USB protocol, and to the socket.
- virtual [~FPGAHandler](#) ()
- void [OpenFile](#) ()
Open an output file to store header/HPTDC events.
- void [CloseFile](#) ()
Close a previously opened output file used to store header/HPTDC events.
- std::string [GetFilename](#) () const
Retrieve the file name used to store data collected from the FPGA.
- void [SetConfiguration](#) (const [TDCConfiguration](#) &c)
Submit the HPTDC setup word as a [TDCConfiguration](#) object.
- [TDCConfiguration](#) [GetConfiguration](#) ()
Retrieve the HPTDC setup word as a [TDCConfiguration](#) object.
- void [ReadBuffer](#) ()
- SocketType [GetType](#) () const
[Socket](#) actor type retrieval method.

Additional Inherited Members

3.4.1 Detailed Description

Driver for timing detectors' FPGA readout.

Main driver for a homebrew FPGA designed for the timing detectors' HPTDC chip readout.

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

14 Apr 2015

3.4.2 Constructor & Destructor Documentation

3.4.2.1 `FPGAHandler::FPGAHandler (int port, const char * dev)`

Bind to a FPGA through the USB protocol, and to the socket.

3.4.2.2 `virtual FPGAHandler::~~FPGAHandler ()` `[virtual]`

3.4.3 Member Function Documentation

3.4.3.1 `void FPGAHandler::CloseFile ()`

Close a previously opened output file used to store header/HPTDC events.

3.4.3.2 `TDCConfiguration FPGAHandler::GetConfiguration ()` `[inline]`

Retrieve the HPTDC setup word as a [TDCConfiguration](#) object.

3.4.3.3 `std::string FPGAHandler::GetFilename () const` `[inline]`

Retrieve the file name used to store data collected from the FPGA.

3.4.3.4 `SocketType FPGAHandler::GetType () const` `[inline], [virtual]`

[Socket](#) actor type retrieval method.

Reimplemented from [Client](#).

3.4.3.5 `void FPGAHandler::OpenFile ()`

Open an output file to store header/HPTDC events.

3.4.3.6 `void FPGAHandler::ReadBuffer ()`

3.4.3.7 `void FPGAHandler::SetConfiguration (const TDCConfiguration & c)` `[inline]`

Submit the HPTDC setup word as a [TDCConfiguration](#) object.

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

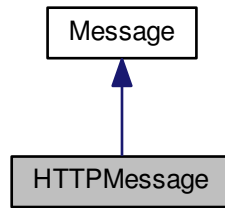
- `include/FPGAHandler.h`

3.5 HTTPMessage Class Reference

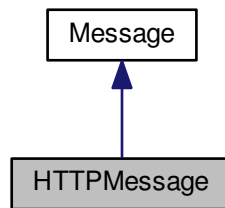
[Message](#) to be transmitted through a WebSocket protocol.

```
#include <HTTPMessage.h>
```

Inheritance diagram for HTTPMessage:



Collaboration diagram for HTTPMessage:



Public Member Functions

- `HTTPMessage` (WebSocket *ws, `Message` m, MessageAction a)
- `HTTPMessage` (WebSocket *ws, const char *msg, MessageAction a)
- void `Decode` ()
- void `Encode` ()
- MessageKey `GetKey` () const
- void `Dump` (std::ostream &os=std::cout) const

Additional Inherited Members

3.5.1 Detailed Description

`Message` to be transmitted through a WebSocket protocol.

Type of message compatible to the transmission through a WebSocket protocol. It enables a direct conversion of standards from any socket message format used elsewhere in this code using the *MessageAction* statement.

Author

Laurent Forthomme laurent.forthomme@cern.ch

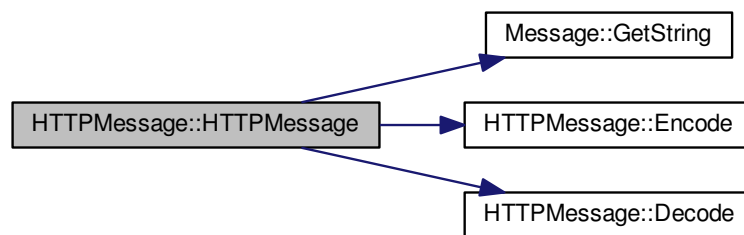
Date

1 Apr 2015

3.5.2 Constructor & Destructor Documentation

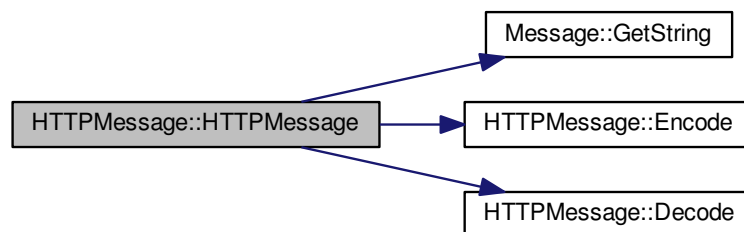
3.5.2.1 HTTPMessage::HTTPMessage (WebSocket * *ws*, Message *m*, MessageAction *a*) [inline]

Here is the call graph for this function:



3.5.2.2 HTTPMessage::HTTPMessage (WebSocket * *ws*, const char * *msg*, MessageAction *a*) [inline]

Here is the call graph for this function:



3.5.3 Member Function Documentation

3.5.3.1 void HTTPMessage::Decode () [inline]

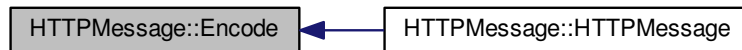
Here is the caller graph for this function:



3.5.3.2 void HTTPMessage::Dump (std::ostream & os = std::cout) const [inline]

3.5.3.3 void HTTPMessage::Encode () [inline]

Here is the caller graph for this function:



3.5.3.4 MessageKey HTTPMessage::GetKey () const [inline]

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

- include/HTTPMessage.h

3.6 ListenerInfo Struct Reference

Information on a socket's listener.

```
#include <Messenger.h>
```

Data Fields

- std::string [name](#)
- SocketType [type](#)

3.6.1 Detailed Description

Information on a socket's listener.

Structure handling its name and type for any listener/client to be used in the socket management parts of this code.

3.6.2 Field Documentation

3.6.2.1 `std::string ListenerInfo::name`

3.6.2.2 `SocketType ListenerInfo::type`

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

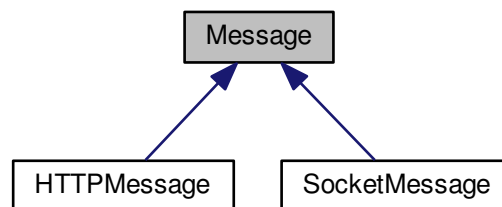
- `include/Messenger.h`

3.7 Message Class Reference

Base socket message type.

```
#include <Message.h>
```

Inheritance diagram for Message:



Public Member Functions

- [Message](#) ()
Void message constructor.
- [Message](#) (const char *msg)
Construct a message from a string.
- [Message](#) (std::string msg)
Construct a message from a string.
- virtual [~Message](#) ()
- MessageKey [GetKey](#) () const
Placeholder for the MessageKey retrieval method.
- std::string [GetString](#) () const
Retrieve the string carried by this message as a whole.
- bool [IsFromWeb](#) () const
Extract from any message its potential arrival from a WebSocket protocol.
- void [Dump](#) (std::ostream &os=std::cout) const

Protected Attributes

- std::string [fString](#)

3.7.1 Detailed Description

Base socket message type.

Base handler for messages to be transmitted through the socket

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

6 Apr 2015

3.7.2 Constructor & Destructor Documentation

3.7.2.1 `Message::Message ()` `[inline]`

Void message constructor.

3.7.2.2 `Message::Message (const char * msg)` `[inline]`

Construct a message from a string.

3.7.2.3 `Message::Message (std::string msg)` `[inline]`

Construct a message from a string.

3.7.2.4 `virtual Message::~~Message ()` `[inline]`, `[virtual]`

3.7.3 Member Function Documentation

3.7.3.1 `void Message::Dump (std::ostream & os = std::cout) const` `[inline]`

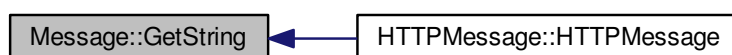
3.7.3.2 `MessageKey Message::GetKey () const` `[inline]`

Placeholder for the MessageKey retrieval method.

3.7.3.3 `std::string Message::GetString () const` `[inline]`

Retrieve the string carried by this message as a whole.

Here is the caller graph for this function:



3.7.3.4 `bool Message::IsFromWeb () const [inline]`

Extract from any message its potential arrival from a WebSocket protocol.

3.7.4 Field Documentation

3.7.4.1 `std::string Message::fString [protected]`

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

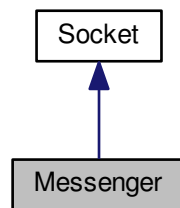
- `include/Message.h`

3.8 Messenger Class Reference

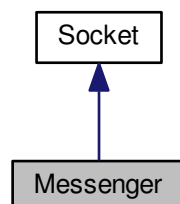
Base master object for the socket.

```
#include <Messenger.h>
```

Inheritance diagram for Messenger:



Collaboration diagram for Messenger:



Public Member Functions

- [Messenger \(\)](#)

- Build a void master object or socket actor.*
- [Messenger](#) (int port)
- Build a master object to control the socket.*
- [~Messenger](#) ()
- bool [Connect](#) ()
- Connect the master to the socket.*
- void [Disconnect](#) ()
- Remove the master and destroy the socket.*
- void [Send](#) (const [Message](#) &m, int sid) const
- Send any type of message to any client.*
- void [Receive](#) ()
- Handle a message reception from a client.*
- void [Broadcast](#) (const [Message](#) &m) const
- Emit a message to all clients connected through the socket.*
- SocketType [GetType](#) () const
- Socket actor type retrieval method.*

Additional Inherited Members

3.8.1 Detailed Description

Base master object for the socket.

Messenger/broadcaster object used by the server to send/receive commands from the clients/listeners.

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

23 Mar 2015

3.8.2 Constructor & Destructor Documentation

3.8.2.1 [Messenger::Messenger](#) ()

Build a void master object or socket actor.

3.8.2.2 [Messenger::Messenger](#) (int port)

Build a master object to control the socket.

3.8.2.3 [Messenger::~~Messenger](#) ()

3.8.3 Member Function Documentation

3.8.3.1 [void Messenger::Broadcast](#) (const [Message](#) & m) const

Emit a message to all clients connected through the socket.

Parameters

in	<i>m</i>	Message to transmit
----	----------	-------------------------------------

3.8.3.2 `bool Messenger::Connect ()`

Connect the master to the socket.

Connect this master to the socket for clients to be able to bind.

3.8.3.3 `void Messenger::Disconnect ()`

Remove the master and destroy the socket.

Remove this master from the socket, thus disconnecting automatically the clients connected.

3.8.3.4 `SocketType Messenger::GetType () const` `[inline]`

[Socket](#) actor type retrieval method.

3.8.3.5 `void Messenger::Receive ()`

Handle a message reception from a client.

3.8.3.6 `void Messenger::Send (const Message & m, int sid) const` `[inline]`

Send any type of message to any client.

Parameters

in	<i>m</i>	Message to transmit
in	<i>sid</i>	Unique identifier of the client on this socket

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

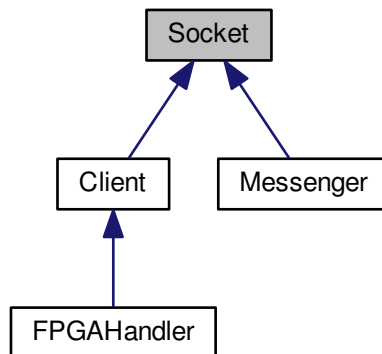
- include/Messenger.h

3.9 Socket Class Reference

Base socket object from which clients/master from a socket inherit.

```
#include <Socket.h>
```

Inheritance diagram for Socket:



Public Member Functions

- [Socket](#) ()
- [Socket](#) (int port)
- virtual [~Socket](#) ()
- void [Stop](#) ()
Terminates the socket and all attached communications.
- void [SetPort](#) (int port)
- int [GetPort](#) () const
Retrieve the port used for this socket.
- void [AcceptConnections](#) ([Socket](#) &socket)
Accept connection from a client.
- void [SelectConnections](#) ()
- void [SetSocketId](#) (int sid)
- int [GetSocketId](#) () const
- SocketType [GetSocketType](#) (int sid) const
- bool [IsWebSocket](#) (int sid) const
- void [DumpConnected](#) () const

Protected Member Functions

- bool [Start](#) ()
Start the socket.
- void [Bind](#) ()
Bind a name to a socket.
- void [PrepareConnection](#) ()
- void [Listen](#) (int maxconn)
Listen to incoming messages.
- void [SendMessage](#) ([Message](#) message, int id=-1) const
Send a message on a socket.
- [Message](#) [FetchMessage](#) (int id=-1) const
Receive a message from a socket.

Protected Attributes

- int `fPort`
- char `fBuffer` [MAX_WORD_LENGTH]
- SocketCollection `fSocketsConnected`
- fd_set `fMaster`

Master file descriptor list.

- fd_set `fReadFds`

Temp file descriptor list for select()

3.9.1 Detailed Description

Base socket object from which clients/master from a socket inherit.

General object providing all useful method to connect/bind/send/receive information through system sockets.

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

23 Mar 2015

3.9.2 Constructor & Destructor Documentation

3.9.2.1 `Socket::Socket ()` [inline]

3.9.2.2 `Socket::Socket (int port)`

3.9.2.3 `virtual Socket::~~Socket ()` [virtual]

3.9.3 Member Function Documentation

3.9.3.1 `void Socket::AcceptConnections (Socket & socket)`

Accept connection from a client.

Set the socket to accept connections any client transmitting through the socket

Parameters

<code>in, out</code>	<code>socket</code>	Master/client object to enable on the socket
----------------------	---------------------	--

3.9.3.2 `void Socket::Bind ()` [protected]

Bind a name to a socket.

Returns

Success of the operation

3.9.3.3 `void Socket::DumpConnected () const`

3.9.3.4 `Message Socket::FetchMessage (int id = -1) const` [protected]

Receive a message from a socket.

Returns

Received message as a `std::string`

3.9.3.5 `int Socket::GetPort () const` [inline]

Retrieve the port used for this socket.

3.9.3.6 `int Socket::GetSocketId () const` [inline]

3.9.3.7 `SocketType Socket::GetSocketType (int sid) const` [inline]

Here is the caller graph for this function:



3.9.3.8 `bool Socket::IsWebSocket (int sid) const` [inline]

Here is the call graph for this function:



3.9.3.9 `void Socket::Listen (int maxconn)` [protected]

Listen to incoming messages.

Set the socket to listen to any message coming from outside

3.9.3.10 `void Socket::PrepareConnection ()` [protected]

3.9.3.11 `void Socket::SelectConnections ()`

Register all open file descriptors to read their communication through the socket

3.9.3.12 `void Socket::SendMessage (Message message, int id = -1) const` [protected]

Send a message on a socket.

Here is the caller graph for this function:



3.9.3.13 `void Socket::SetPort (int port)` [inline]

3.9.3.14 `void Socket::SetSocketId (int sid)` [inline]

3.9.3.15 `bool Socket::Start ()` [protected]

Start the socket.

Launch all mandatory operations to set the socket to be used

Returns

Success of the operation

3.9.3.16 `void Socket::Stop ()`

Terminates the socket and all attached communications.

3.9.4 Field Documentation

3.9.4.1 `char Socket::fBuffer[MAX_WORD_LENGTH]` [protected]

3.9.4.2 `fd_set Socket::fMaster` [protected]

Master file descriptor list.

3.9.4.3 `int Socket::fPort` [protected]

3.9.4.4 `fd_set Socket::fReadFds` [protected]

Temp file descriptor list for select()

3.9.4.5 SocketCollection Socket::fSocketsConnected [protected]

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

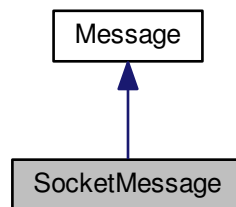
- include/Socket.h

3.10 SocketMessage Class Reference

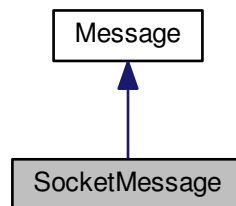
Socket-passed message type.

```
#include <SocketMessage.h>
```

Inheritance diagram for SocketMessage:



Collaboration diagram for SocketMessage:



Public Member Functions

- [SocketMessage](#) ()
- [SocketMessage](#) (const [Message](#) &msg)
- [SocketMessage](#) (const char *msg_s)
- [SocketMessage](#) (std::string msg_s)
- [SocketMessage](#) (const MessageKey &key)
Construct a socket message out of a key.
- [SocketMessage](#) (const MessageKey &key, const char *value)

- Construct a socket message out of a key and a string-type value.*

 - [SocketMessage](#) (const MessageKey &key, std::string value)
- Construct a socket message out of a key and a string-type value.*

 - [SocketMessage](#) (const MessageKey &key, const int value)
- Construct a socket message out of a key and an integer-type value.*

 - [SocketMessage](#) (const MessageKey &key, const float value)
- Construct a socket message out of a key and a float-type value.*

 - [SocketMessage](#) (const MessageKey &key, const double value)
- Construct a socket message out of a key and a double precision-type value.*

 - [SocketMessage](#) (MessageMap msg_m)
- Construct a socket message out of a map of key/string-type value.*

 - [~SocketMessage](#) ()
- String-valued message.*

 - void [SetKeyValue](#) (const MessageKey &key, const char *value)
- Send an integer-valued message.*

 - void [SetKeyValue](#) (const MessageKey &key, int int_value)
- Float-valued message.*

 - void [SetKeyValue](#) (const MessageKey &key, float float_value)
- Double-valued message.*

 - void [SetKeyValue](#) (const MessageKey &key, double double_value)
- Extract the whole key:value message.*

 - std::string [GetString](#) () const
- Extract the message's key.*

 - MessageKey [GetKey](#) () const
- Extract the message's string value.*

 - std::string [GetValue](#) () const
- Extract the message's integer value.*

 - int [GetIntValue](#) () const
- Extract the message's vector of string value.*

 - VectorValue [GetVectorValue](#) () const
- void [Dump](#) (std::ostream &os=std::cout) const*

Additional Inherited Members

3.10.1 Detailed Description

Socket-passed message type.

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

26 Mar 2015

3.10.2 Constructor & Destructor Documentation

3.10.2.1 `SocketMessage::SocketMessage ()` `[inline]`

3.10.2.2 `SocketMessage::SocketMessage (const Message & msg)` `[inline]`

3.10.2.3 `SocketMessage::SocketMessage (const char * msg_s)` `[inline]`

3.10.2.4 `SocketMessage::SocketMessage (std::string msg_s)` `[inline]`

3.10.2.5 `SocketMessage::SocketMessage (const MessageKey & key)` `[inline]`

Construct a socket message out of a key.

Here is the call graph for this function:



3.10.2.6 `SocketMessage::SocketMessage (const MessageKey & key, const char * value)` `[inline]`

Construct a socket message out of a key and a string-type value.

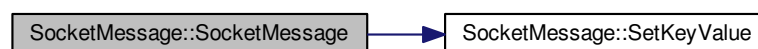
Here is the call graph for this function:



3.10.2.7 `SocketMessage::SocketMessage (const MessageKey & key, std::string value)` `[inline]`

Construct a socket message out of a key and a string-type value.

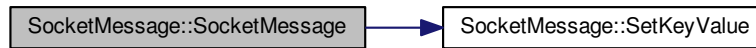
Here is the call graph for this function:



3.10.2.8 SocketMessage::SocketMessage (const MessageKey & key, const int value) [inline]

Construct a socket message out of a key and an integer-type value.

Here is the call graph for this function:



3.10.2.9 SocketMessage::SocketMessage (const MessageKey & key, const float value) [inline]

Construct a socket message out of a key and a float-type value.

Here is the call graph for this function:



3.10.2.10 SocketMessage::SocketMessage (const MessageKey & key, const double value) [inline]

Construct a socket message out of a key and a double precision-type value.

Here is the call graph for this function:



3.10.2.11 SocketMessage::SocketMessage (MessageMap msg_m) [inline]

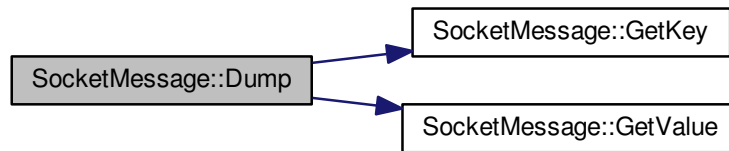
Construct a socket message out of a map of key/string-type value.

3.10.2.12 SocketMessage::~~SocketMessage () [inline]

3.10.3 Member Function Documentation

3.10.3.1 `void SocketMessage::Dump (std::ostream & os = std::cout) const [inline]`

Here is the call graph for this function:



3.10.3.2 `int SocketMessage::GetIntValue () const [inline]`

Extract the message's integer value.

3.10.3.3 `MessageKey SocketMessage::GetKey () const [inline]`

Extract the message's key.

Here is the caller graph for this function:



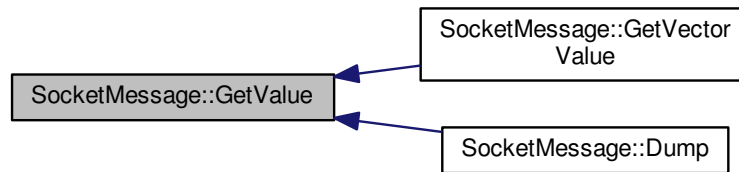
3.10.3.4 `std::string SocketMessage::GetString () const [inline]`

Extract the whole key:value message.

3.10.3.5 `std::string SocketMessage::GetValue () const [inline]`

Extract the message's string value.

Here is the caller graph for this function:



3.10.3.6 `VectorValue SocketMessage::GetVectorValue () const [inline]`

Extract the message's vector of string value.

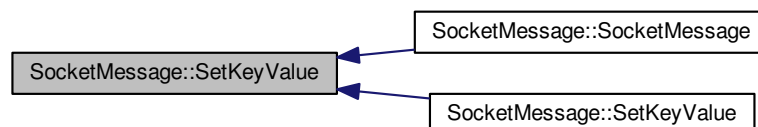
Here is the call graph for this function:



3.10.3.7 `void SocketMessage::SetKeyValue (const MessageKey & key, const char * value) [inline]`

String-valued message.

Here is the caller graph for this function:



3.10.3.8 `void SocketMessage::SetKeyValue (const MessageKey & key, int int_value) [inline]`

Send an integer-valued message.

Here is the call graph for this function:



3.10.3.9 `void SocketMessage::SetKeyValue (const MessageKey & key, float float_value) [inline]`

Float-valued message.

Here is the call graph for this function:



3.10.3.10 `void SocketMessage::SetKeyValue (const MessageKey & key, double double_value) [inline]`

Double-valued message.

Here is the call graph for this function:



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

- include/SocketMessage.h

3.11 TDCConfiguration Class Reference

Setup word to be sent to the HPTDC chip.

```
#include <TDCConfiguration.h>
```

Public Types

- enum [EdgeResolution](#) {
[E_100ps](#) =0, [E_200ps](#), [E_400ps](#), [E_800ps](#),
[E_1p6ns](#), [E_3p12ns](#), [E_6p25ns](#), [E_12p5ns](#) }
- enum [DeadTime](#) { [DT_5ns](#) =0, [DT_10ns](#), [DT_30ns](#), [DT_100ns](#) }
- enum [WidthResolution](#) {
[W_100ps](#) =0, [W_200ps](#), [W_400ps](#), [W_800ps](#),
[W_1p6ns](#), [W_3p2ns](#), [W_6p25ns](#), [W_12p5ns](#),
[W_25ns](#), [W_50ns](#), [W_100ns](#), [W_200ns](#),
[W_400ns](#), [W_800ns](#) }
- enum [EnabledError](#) {
[VernierError](#) =0x1, [CoarseError](#) =0x2, [ChannelSelectError](#) =0x4, [L1BufferParityError](#) =0x8,
[TriggerFIFOParityError](#) =0x10, [TriggerMatchingError](#) =0x20, [ReadoutFIFOParityError](#) =0x40, [ReadoutStateError](#) =0x80,
[SetupParityError](#) =0x100, [ControlParityError](#) =0x200, [JTAGInstructionParityError](#) =0x400 }

Public Member Functions

- [TDCConfiguration](#) ()
- virtual [~TDCConfiguration](#) ()
- void [SetWord](#) (const unsigned int i, const word_t word)
Set one single word in the configuration.
- word_t [GetWord](#) (const unsigned int i) const
Retrieve one single word from the configuration.
- uint8_t [GetNumWords](#) () const
Number of words in the configuration.
- void [SetEnableError](#) (const uint16_t &err)
- uint16_t [GetEnableError](#) () const
- void [SetEdgeResolution](#) (const [EdgeResolution](#) r)
- [EdgeResolution](#) [GetEdgeResolution](#) () const
- void [SetMaxEventSize](#) (unsigned int sz)
Set the maximum number of hits per event.
- uint8_t [GetMaxEventSize](#) () const
Extract the maximum number of hits per event.
- void [SetRejectFIFOFull](#) (bool rej=true)
Reject hits when readout FIFO full.
- bool [GetRejectFIFOFull](#) () const
Are hits rejected when readout FIFO is full?
- void [SetChannelOffset](#) (int channel, uint16_t offset)
- uint16_t [GetChannelOffset](#) (int channel) const
- void [SetAllChannelsOffset](#) (uint16_t offset)
- void [SetDLLAdjustment](#) (int tap, uint8_t adj)
Set the DLL taps adjustments with a resolution of ~10 ps.
- uint8_t [GetDLLAdjustment](#) (int tap) const
- void [SetAllTapsDLLAdjustment](#) (uint8_t adj)
- void [SetRCAdjustment](#) (int tap, uint8_t adj)
- uint8_t [GetRCAdjustment](#) (int tap)
- void [SetWidthResolution](#) (const [WidthResolution](#) r)
- [WidthResolution](#) [GetWidthResolution](#) () const
- void [SetDeadTime](#) (const [DeadTime](#) dt)
- [DeadTime](#) [GetDeadTime](#) () const
- void [SetLeadingMode](#) (const bool lead=true)

- Enable the detection of leading edges.*
- bool [GetLeadingMode](#) () const
- Extract the status for the detection of leading edges.*
- void [SetTrailingMode](#) (const bool trail=true)
- Enable/disable the detection of trailing edges.*
- bool [GetTrailingMode](#) () const
- Extract the status for the detection of trailing edges.*
- void [SetTriggerMatchingMode](#) (const bool trig=true)
- bool [GetTriggerMatchingMode](#) () const
- void [SetEdgesPairing](#) (const bool pair=true)
- bool [GetEdgesPairing](#) () const
- void [Dump](#) (int verb=1, std::ostream &os=std::cout) const

3.11.1 Detailed Description

Setup word to be sent to the HPTDC chip.

Object handling the configuration word provided by/to the HPTDC chip

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

16 Apr 2015

3.11.2 Member Enumeration Documentation

3.11.2.1 enum TDCCConfiguration::DeadTime

Enumerator

DT_5ns
DT_10ns
DT_30ns
DT_100ns

3.11.2.2 enum TDCCConfiguration::EdgeResolution

Enumerator

E_100ps
E_200ps
E_400ps
E_800ps
E_1p6ns
E_3p12ns
E_6p25ns
E_12p5ns

3.11.2.3 enum TDCCConfiguration::EnabledError

Enumerator

VernierError
CoarseError
ChannelSelectError
L1BufferParityError
TriggerFIFOParityError
TriggerMatchingError
ReadoutFIFOParityError
ReadoutStateError
SetupParityError
ControlParityError
JTAGInstructionParityError

3.11.2.4 enum TDCCConfiguration::WidthResolution

Enumerator

W_100ps
W_200ps
W_400ps
W_800ps
W_1p6ns
W_3p2ns
W_6p25ns
W_12p5ns
W_25ns
W_50ns
W_100ns
W_200ns
W_400ns
W_800ns

3.11.3 Constructor & Destructor Documentation

3.11.3.1 TDCCConfiguration::TDCCConfiguration ()

3.11.3.2 virtual TDCCConfiguration::~~TDCCConfiguration () [inline], [virtual]

3.11.4 Member Function Documentation

3.11.4.1 void TDCCConfiguration::Dump (int *verb* = 1, std::ostream & *os* = std::cout) const

3.11.4.2 uint16_t TDCCConfiguration::GetChannelOffset (int *channel*) const [inline]

3.11.4.3 DeadTime TDCCConfiguration::GetDeadTime () const [inline]

3.11.4.4 `uint8_t TDCCConfiguration::GetDLLAdjustment (int tap) const` `[inline]`

3.11.4.5 `EdgeResolution TDCCConfiguration::GetEdgeResolution () const` `[inline]`

3.11.4.6 `bool TDCCConfiguration::GetEdgesPairing () const` `[inline]`

3.11.4.7 `uint16_t TDCCConfiguration::GetEnableError () const` `[inline]`

3.11.4.8 `bool TDCCConfiguration::GetLeadingMode () const` `[inline]`

Extract the status for the detection of leading edges.

3.11.4.9 `uint8_t TDCCConfiguration::GetMaxEventSize () const` `[inline]`

Extract the maximum number of hits per event.

3.11.4.10 `uint8_t TDCCConfiguration::GetNumWords () const` `[inline]`

Number of words in the configuration.

Return the number of words making up the full configuration word.

3.11.4.11 `uint8_t TDCCConfiguration::GetRCAdjustment (int tap)` `[inline]`

3.11.4.12 `bool TDCCConfiguration::GetRejectFIFOFull () const` `[inline]`

Are hits rejected when readout FIFO is full?

Extract whether or not hits are rejected once FIFO is full.

3.11.4.13 `bool TDCCConfiguration::GetTrailingMode () const` `[inline]`

Extract the status for the detection of trailing edges.

3.11.4.14 `bool TDCCConfiguration::GetTriggerMatchingMode () const` `[inline]`

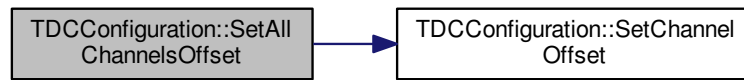
3.11.4.15 `WidthResolution TDCCConfiguration::GetWidthResolution () const` `[inline]`

3.11.4.16 `word_t TDCCConfiguration::GetWord (const unsigned int i) const` `[inline]`

Retrieve one single word from the configuration.

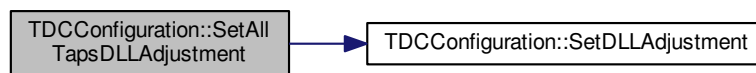
3.11.4.17 void TDCConfiguration::SetAllChannelsOffset (uint16_t *offset*) [inline]

Here is the call graph for this function:



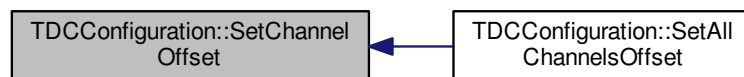
3.11.4.18 void TDCConfiguration::SetAllTapsDLLAdjustment (uint8_t *adj*) [inline]

Here is the call graph for this function:



3.11.4.19 void TDCConfiguration::SetChannelOffset (int *channel*, uint16_t *offset*) [inline]

Here is the caller graph for this function:

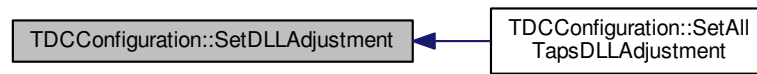


3.11.4.20 void TDCConfiguration::SetDeadTime (const DeadTime *dt*) [inline]

3.11.4.21 void TDCConfiguration::SetDLLAdjustment (int *tap*, uint8_t *adj*) [inline]

Set the DLL taps adjustments with a resolution of ~ 10 ps.

Here is the caller graph for this function:



3.11.4.22 `void TDCConfiguration::SetEdgeResolution (const EdgeResolution r) [inline]`

3.11.4.23 `void TDCConfiguration::SetEdgesPairing (const bool pair = true) [inline]`

3.11.4.24 `void TDCConfiguration::SetEnableError (const uint16_t & err) [inline]`

3.11.4.25 `void TDCConfiguration::SetLeadingMode (const bool lead = true) [inline]`

Enable the detection of leading edges.

3.11.4.26 `void TDCConfiguration::SetMaxEventSize (unsigned int sz) [inline]`

Set the maximum number of hits per event.

Set the maximum number of hits that can be recorded for each event. It is always rounded to the next power of 2 (in the range 0-128), and if bigger than 128 then set to unlimited.

3.11.4.27 `void TDCConfiguration::SetRCAdjustment (int tap, uint8_t adj) [inline]`

3.11.4.28 `void TDCConfiguration::SetRejectFIFOFull (bool rej = true) [inline]`

Reject hits when readout FIFO full.

Set whether or not hits are rejected once FIFO is full.

3.11.4.29 `void TDCConfiguration::SetTrailingMode (const bool trail = true) [inline]`

Enable/disable the detection of trailing edges.

3.11.4.30 `void TDCConfiguration::SetTriggerMatchingMode (const bool trig = true) [inline]`

3.11.4.31 `void TDCConfiguration::SetWidthResolution (const WidthResolution r) [inline]`

3.11.4.32 `void TDCConfiguration::SetWord (const unsigned int i, const word_t word) [inline]`

Set one single word in the configuration.

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

- `include/TDCConfiguration.h`

3.12 TDCEvent Class Reference

HPTDC event parser.

```
#include <TDCEvent.h>
```

Public Types

- enum [EventType](#) {
[Invalid](#) = -1, [GroupHeader](#) = 0, [GroupTrailer](#), [TDCHeader](#),
[TDCTrailer](#), [LeadingEdge](#), [TrailingEdge](#), [Error](#),
[Debug](#) }

Public Member Functions

- [TDCEvent](#) (const uint32_t &word)
- virtual [~TDCEvent](#) ()
- [EventType](#) [GetType](#) () const
Type of packet read out from the TDC.
- unsigned int [GetTDCId](#) () const
Programmed identifier of master TDC.
- uint16_t [GetEventId](#) () const
Event identifier from event counter.
- uint16_t [GetWordCount](#) () const
Total number of words in event (including headers and trailers)
- uint16_t [GetBunchId](#) () const
Bunch identifier of trigger (or trigger time tag)
- uint32_t [GetLeadingTime](#) (bool pair=false) const
Leading edge measurement in programmed time resolution.
- uint8_t [GetWidth](#) () const
Width of pulse in programmed time resolution.
- uint32_t [GetTrailingTime](#) () const
Trailing edge measurement in programmed time resolution.
- uint16_t [GetErrorFlags](#) () const
Return error flags if an error condition has been detected.

3.12.1 Detailed Description

HPTDC event parser.

Object enabling to decipher any measurement/error/debug event returned by the HPTDC chip

Author

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Date

20 Apr 2015

3.12.2 Member Enumeration Documentation

3.12.2.1 enum TDCEvent::EventType

Enumerator

Invalid
GroupHeader
GroupTrailer
TDCHeader
TDCTrailer
LeadingEdge
TrailingEdge
Error
Debug

3.12.3 Constructor & Destructor Documentation

3.12.3.1 TDCEvent::TDCEvent (const uint32_t & word) [inline]

3.12.3.2 virtual TDCEvent::~~TDCEvent () [inline],[virtual]

3.12.4 Member Function Documentation

3.12.4.1 uint16_t TDCEvent::GetBunchId () const [inline]

Bunch identifier of trigger (or trigger time tag)

Here is the call graph for this function:



3.12.4.2 uint16_t TDCEvent::GetErrorFlags () const [inline]

Return error flags if an error condition has been detected.

Here is the call graph for this function:



3.12.4.3 `uint16_t TDCEvent::GetEventId () const [inline]`

Event identifier from event counter.

Here is the call graph for this function:



3.12.4.4 `uint32_t TDCEvent::GetLeadingTime (bool pair = false) const [inline]`

Leading edge measurement in programmed time resolution.

Here is the call graph for this function:



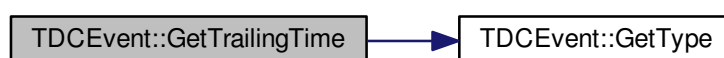
3.12.4.5 `unsigned int TDCEvent::GetTDCId () const [inline]`

Programmed identifier of master TDC.

3.12.4.6 `uint32_t TDCEvent::GetTrailingTime () const [inline]`

Trailing edge measurement in programmed time resolution.

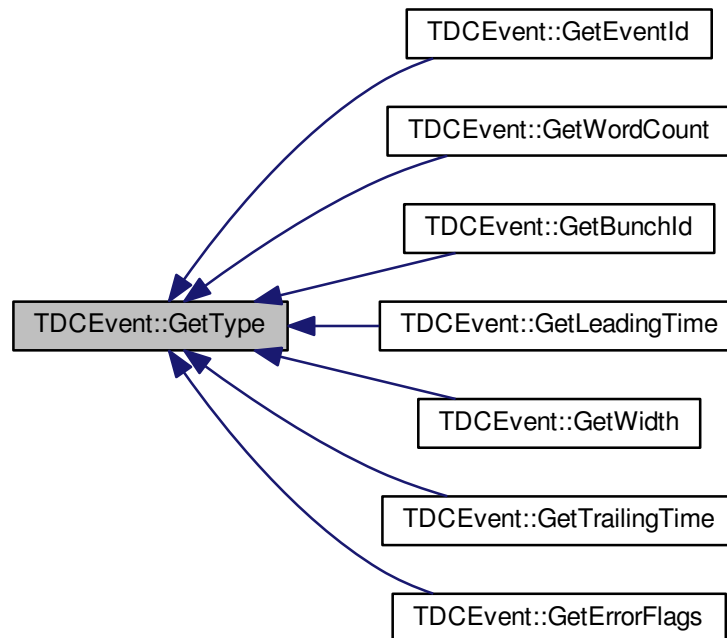
Here is the call graph for this function:



3.12.4.7 EventType TDCEvent::GetType () const [inline]

Type of packet read out from the TDC.

Here is the caller graph for this function:



3.12.4.8 uint8_t TDCEvent::GetWidth () const [inline]

Width of pulse in programmed time resolution.

Here is the call graph for this function:



3.12.4.9 uint16_t TDCEvent::GetWordCount () const [inline]

Total number of words in event (including headers and trailers)

Here is the call graph for this function:



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

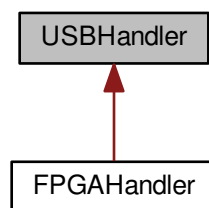
- include/TDCEvent.h

3.13 USBHandler Class Reference

Generic USB communication handler.

```
#include <USBHandler.h>
```

Inheritance diagram for USBHandler:



Public Member Functions

- [USBHandler](#) (const char *dev)
- virtual [~USBHandler](#) ()

Protected Member Functions

- void [WriteUSB](#) (uint32_t word, uint8_t size) const
Write a word to the USB device.
- uint32_t [FetchUSB](#) (uint8_t size) const
Receive a word from the USB device.

3.13.1 Detailed Description

Generic USB communication handler.

Date

21 Apr 2015

Author

Laurent Forthomme laurent.forthomme@cern.ch

3.13.2 Constructor & Destructor Documentation

3.13.2.1 `USBHandler::USBHandler (const char * dev)` `[inline]`

3.13.2.2 `virtual USBHandler::~~USBHandler ()` `[inline],[virtual]`

3.13.3 Member Function Documentation

3.13.3.1 `uint32_t USBHandler::FetchUSB (uint8_t size) const` `[inline],[protected]`

Receive a word from the USB device.

3.13.3.2 `void USBHandler::WriteUSB (uint32_t word, uint8_t size) const` `[inline],[protected]`

Write a word to the USB device.

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

- `include/USBHandler.h`

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