2015 Test beam Run Control

Generated by Doxygen 1.8.9.1

Mon Apr 27 2015 10:04:20

Contents

Chapter 1

Module Index

1.1 Modules

Here is a list of all modules:

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

Chapter 3

Data Structure Index

3.1 Data Structures

Here are the data structures with brief descriptions:

Chapter 4

Module Documentation

4.1 Socket communication objects

Data Structures

- class Client

  Base client object for the socket.
- class HTTPMessage

  Message to be transmitted through a WebSocket protocol.
- struct ListenerInfo

  Information on a socket's listener.
- class Messenger

  Base master object for the socket.
- class Socket

  Base socket object from which clients/master from a socket inherit.
- class SocketMessage

  Socket-passed message type.

Enumerations

- enum Socket::SocketType {
  Socket::INVALID =-1, Socket::MASTER =0, Socket::WEBSOCKET_CLIENT, Socket::CLIENT,
  Socket::DETECTOR }

  Type of actor playing a role on the socket.

4.1.1 Detailed Description

4.1.2 Enumeration Type Documentation

4.1.2.1 enum **Socket::SocketType**

Type of actor playing a role on the socket.

Enumerator

INVALID

MASTER

WEBSOCKET_CLIENT

CLIENT

DETECTOR

4.2 HPTDC chip control

General register object to interact with a HPTDC chip.

Data Structures

- class TDCBoundaryScanRegister
- class TDCControl

  Control word to be sent to the HPTDC chip.
- class TDCEvent

  HPTDC event parser.
- class TDCSetup

  Setup word to be sent to the HPTDC chip.
- class TDCStatus

Enumerations

- enum TDCControl::EnablePattern
- enum TDCControl::RegisterName { TDCControl::R_EnablePattern, TDCControl::R_GlobalReset, TDC↩
Control::R_DLLReset, TDCControl::R_PLLReset }
- enum TDCEvent::EventType {
TDCEvent::Invalid =-1, TDCEvent::GroupHeader =0, TDCEvent::GroupTrailer, TDCEvent::TDCHeader,
TDCEvent::TDCTrailer, TDCEvent::LeadingEdge, TDCEvent::TrailingEdge, TDCEvent::Error,
TDCEvent::Debug }
- enum TDCSetup::EdgeResolution {
TDCSetup::E_100ps =0, TDCSetup::E_200ps, TDCSetup::E_400ps, TDCSetup::E_800ps,
TDCSetup::E_1p6ns, TDCSetup::E_3p12ns, TDCSetup::E_6p25ns, TDCSetup::E_12p5ns }
- enum TDCSetup::DeadTime { TDCSetup::DT_5ns =0, TDCSetup::DT_10ns, TDCSetup::DT_30ns, TDC↩
Setup::DT_100ns }
- enum TDCSetup::WidthResolution {
TDCSetup::W_100ps =0, TDCSetup::W_200ps, TDCSetup::W_400ps, TDCSetup::W_800ps,
TDCSetup::W_1p6ns, TDCSetup::W_3p2ns, TDCSetup::W_6p25ns, TDCSetup::W_12p5ns,
TDCSetup::W_25ns, TDCSetup::W_50ns, TDCSetup::W_100ns, TDCSetup::W_200ns,
TDCSetup::W_400ns, TDCSetup::W_800ns }
- enum TDCSetup::EnabledError {
TDCSetup::VernierError =0x1, TDCSetup::CoarseError =0x2, TDCSetup::ChannelSelectError =0x4, TDC↩
Setup::L1BufferParityError =0x8,
TDCSetup::TriggerFIFOParityError =0x10, TDCSetup::TriggerMatchingError =0x20, TDCSetup::ReadoutF↩
IFOParityError =0x40, TDCSetup::ReadoutStateError =0x80,
TDCSetup::SetupParityError =0x100, TDCSetup::ControlParityError =0x200, TDCSetup::JTAGInstruction↩
ParityError =0x400 }
- enum TDCSetup::DLLSpeedMode { TDCSetup::DLL_40MHz =0x0, TDCSetup::DLL_160MHz =0x1, TDC↩
Setup::DLL_320MHz =0x2, TDCSetup::DLL_Illegal =0x3 }
- enum TDCSetup::SerialClockSource { TDCSetup::Serial_pll_clock_80 =0x0, TDCSetup::Serial_pll_clock_↩
160 =0x1, TDCSetup::Serial_pll_clock_40 =0x2, TDCSetup::Serial_aux_clock =0x3 }
- enum TDCSetup::IOClockSource { TDCSetup::IO_clock_40 =0x0, TDCSetup::IO_pll_clock_80 =0x1, TDC↩
Setup::IO_pll_clock_160 =0x2, TDCSetup::IO_aux_clock =0x3 }
- enum TDCSetup::CoreClockSource { TDCSetup::Core_clock_40 =0x0, TDCSetup::Core_pll_clock_80 =0x1,
TDCSetup::Core_pll_clock_160 =0x2, TDCSetup::Core_aux_clock =0x3 }
- enum TDCSetup::DLLClockSource {
TDCSetup::DLL_clock_40 =0x0, TDCSetup::DLL_pll_clock_40 =0x1, TDCSetup::DLL_pll_clock_160 =0x2,
TDCSetup::DLL_pll_clock_320 =0x3,
TDCSetup::DLL_aux_clock =0x4 }
- enum TDCSetup::ReadoutSpeed { TDCSetup::RO_Fixed =0x0, TDCSetup::RO_pll_80Mbits_s =0x1 }

- enum TDCSetup::SerialStrobeType { TDCSetup::SS_NoStrobe =0x0, TDCSetup::SS_DSStrobe =0x1, TD↩ CSetup::SS_LeadingTrailingStrobe =0x2, TDCSetup::SS_LeadingEdge =0x3 }
- enum TDCSetup::ReadoutSingleCycleSpeed {
  TDCSetup::RSC_40Mbits_s =0x0, TDCSetup::RSC_20Mbits_s =0x1, TDCSetup::RSC_10Mbits_s =0x2, T↩ DCSetup::RSC_5Mbits_s =0x3,
  TDCSetup::RSC_2p5Mbits_s =0x4, TDCSetup::RSC_1p25Mbits_s =0x5, TDCSetup::RSC_625kbits_s =0x6, TDCSetup::RSC_312p5kbits_s =0x7 }

4.2.1 Detailed Description

General register object to interact with a HPTDC chip.

Author

Laurent Forthomme `laurent.forthomme@cern.ch`

Date

24 Apr 2015

4.2.2 Enumeration Type Documentation

4.2.2.1 enum TDCSetup::CoreClockSource

Enumerator

Core_clock_40

Core_pll_clock_80

Core_pll_clock_160

Core_aux_clock

4.2.2.2 enum TDCSetup::DeadTime

Enumerator

DT_5ns

DT_10ns

DT_30ns

DT_100ns

4.2.2.3 enum TDCSetup::DLLClockSource

Enumerator

DLL_clock_40

DLL_pll_clock_40

DLL_pll_clock_160

DLL_pll_clock_320

DLL_aux_clock

4.2.2.4 enum TDCSetup::DLLSpeedMode

Enumerator

DLL_40MHz

DLL_160MHz

DLL_320MHz

DLL_Illegal

4.2.2.5 enum TDCSetup::EdgeResolution

Enumerator

E_100ps

E_200ps

E_400ps

E_800ps

E_1p6ns

E_3p12ns

E_6p25ns

E_12p5ns

4.2.2.6 enum TDCSetup::EnabledError

Enumerator

VernierError

CoarseError

ChannelSelectError

L1BufferParityError

TriggerFIFOParityError

TriggerMatchingError

ReadoutFIFOParityError

ReadoutStateError

SetupParityError

ControlParityError

JTAGInstructionParityError

4.2.2.7 enum TDCControl::EnablePattern

4.2.2.8 enum TDCEvent::EventType

Enumerator

Invalid

GroupHeader

GroupTrailer

TDCHeader

TDCTrailer

LeadingEdge

TrailingEdge

Error

Debug

4.2.2.9 enum TDCSetup::IOClockSource

Enumerator

IO_clock_40

IO_pll_clock_80

IO_pll_clock_160

IO_aux_clock

4.2.2.10 enum TDCSetup::ReadoutSingleCycleSpeed

Enumerator

RSC_40Mbits_s

RSC_20Mbits_s

RSC_10Mbits_s

RSC_5Mbits_s

RSC_2p5Mbits_s

RSC_1p25Mbits_s

RSC_625kbits_s

RSC_312p5kbits_s

4.2.2.11 enum TDCSetup::ReadoutSpeed

Enumerator

RO_Fixed

RO_pll_80Mbits_s

4.2.2.12 enum TDCControl::RegisterName

Enumerator

R_EnablePattern

R_GlobalReset

R_DLLReset

R_PLLReset

4.2.2.13 enum TDCSetup::SerialClockSource

Enumerator

Serial_pll_clock_80

Serial_pll_clock_160

Serial_pll_clock_40

Serial_aux_clock

4.2.2.14 enum TDCSetup::SerialStrobeType

Enumerator

SS_NoStrobe

SS_DSStrobe

SS_LeadingTrailingStrobe

SS_LeadingEdge

4.2.2.15 enum TDCSetup::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

Chapter 5

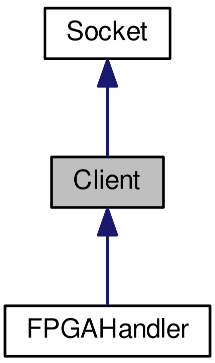
Data Structure Documentation

5.1 Client Class Reference

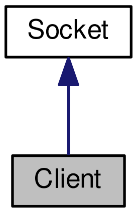
Base client object for the socket.

`#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.

Private Member Functions

- void Announce ()
  Announce our entry on the socket to its master.

Private Attributes

- int fClientId
- bool fIsConnected

Additional Inherited Members

5.1.1 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

5.1.2 Constructor & Destructor Documentation

5.1.2.1 Client::Client ( ) [inline]

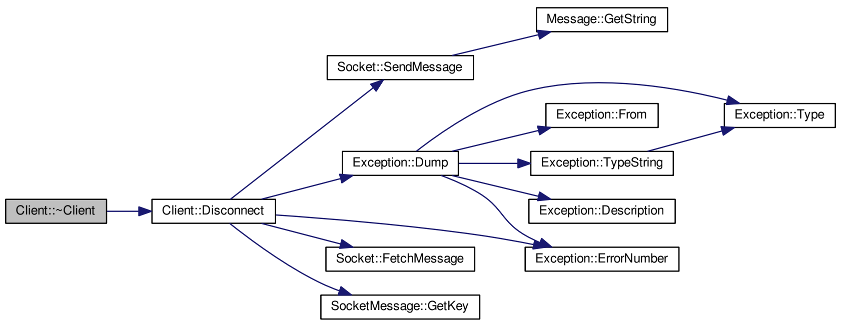
General void client constructor.

5.1.2.2 Client::Client (int *port*)

Bind a socket client to a given port.

5.1.2.3 Client::∼Client ( ) [virtual]

Here is the call graph for this function:

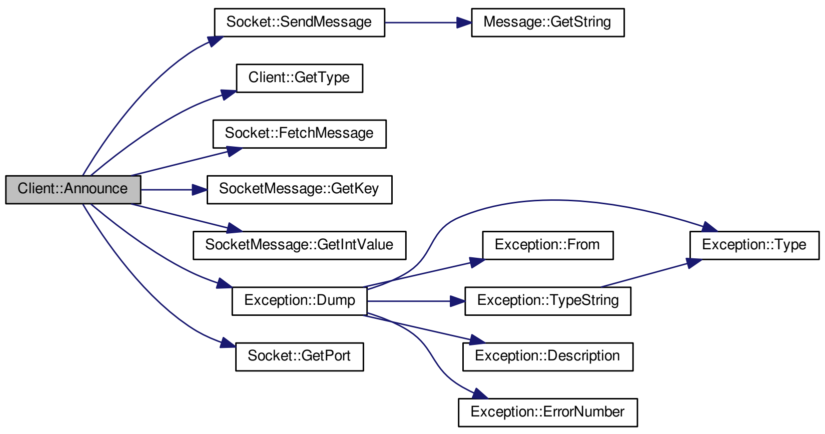


5.1.3 Member Function Documentation

5.1.3.1 void Client::Announce ( ) [private]

Announce our entry on the socket to its master.

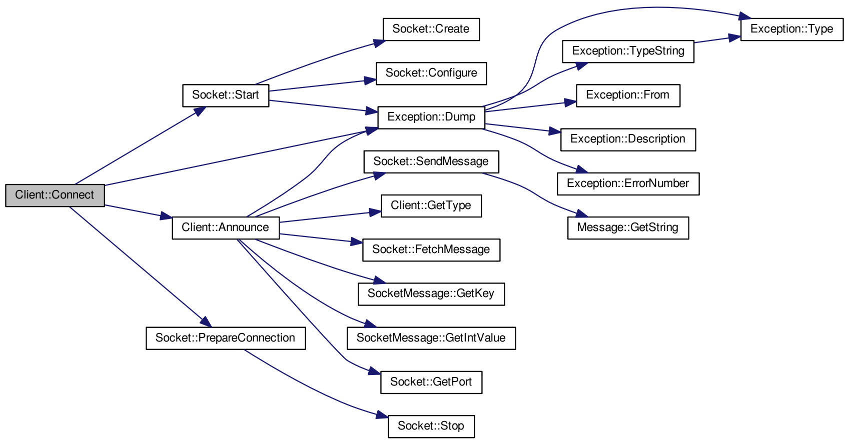
Here is the call graph for this function:



5.1.3.2 bool Client::Connect ( )

Bind this client to the socket.

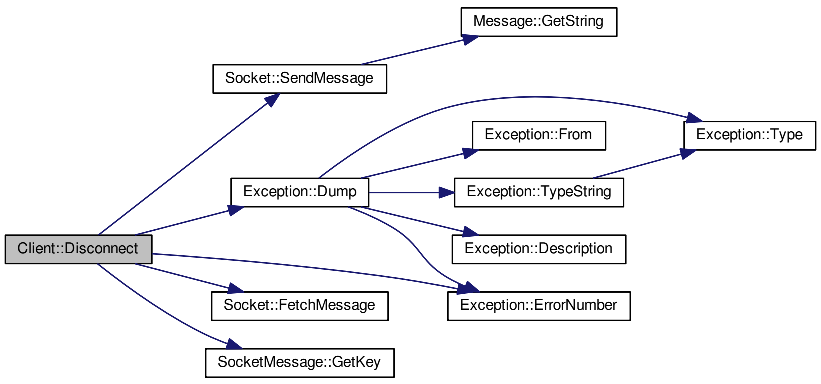
Here is the call graph for this function:



5.1.3.3 void Client::Disconnect ( )

Unbind this client from the socket.

Here is the call graph for this function:



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

Socket actor type retrieval method.

Reimplemented in FPGAHandler.

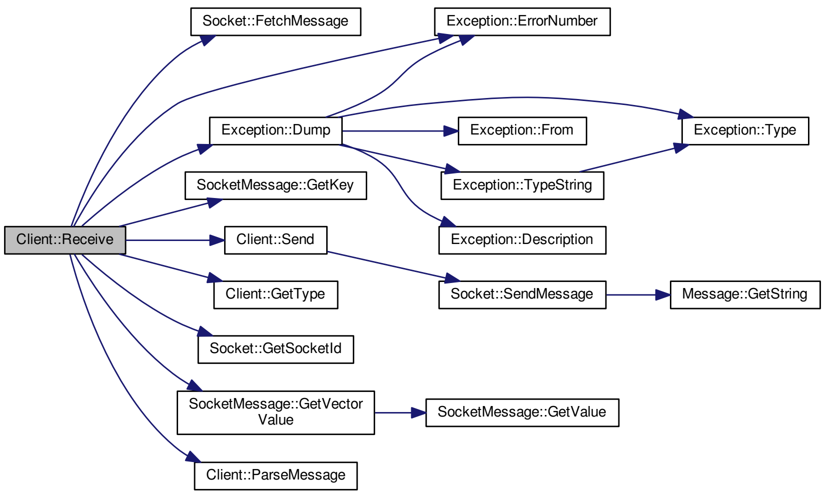
5.1.3.5 virtual void Client::ParseMessage (const SocketMessage & *m*) [inline], [virtual]

Parse a SocketMessage received from the master.

5.1.3.6 void Client::Receive ( )

Receive a socket message from the master.

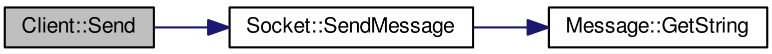
Here is the call graph for this function:



5.1.3.7 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:



5.1.4 Field Documentation

5.1.4.1 int Client::fClientId [private]

5.1.4.2 bool Client::fIsConnected [private]

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

- include/Client.h
- src/Client.cpp

5.2 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

Private Attributes

- std::string fFrom
- std::string fDescription
- ExceptionType fType
- int fErrorNumber

5.2.1 Detailed Description

A simple exception handler.

Author

Laurent Forthomme laurent.forthomme@cern.ch

Date

24 Mar 2015

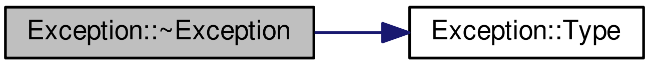
5.2.2 Constructor & Destructor Documentation

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

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

5.2.2.3 Exception::∼Exception ( ) `[inline]`

Here is the call graph for this function:

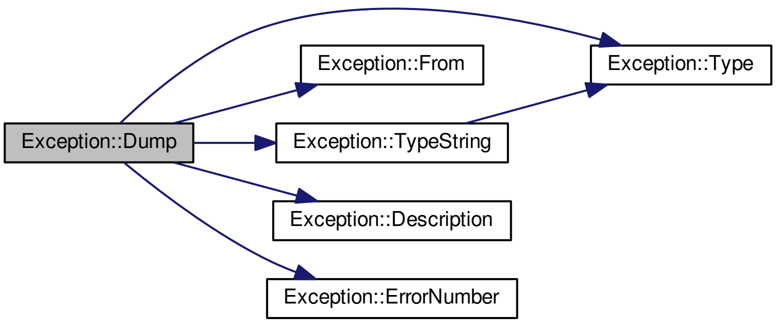


5.2.3 Member Function Documentation

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

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

Here is the call graph for this function:



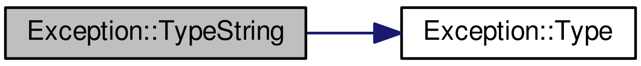
5.2.3.3 int Exception::ErrorNumber ( ) const [inline]

5.2.3.4 std::string Exception::From ( ) const [inline]

5.2.3.5 ExceptionType Exception::Type ( ) const [inline]

5.2.3.6 std::string Exception::TypeString ( ) const [inline]

Here is the call graph for this function:



5.2.4 Field Documentation

5.2.4.1 std::string Exception::fDescription [private]

5.2.4.2 int Exception::fErrorNumber [private]

5.2.4.3 std::string Exception::fFrom [private]

5.2.4.4 ExceptionType Exception::fType [private]

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

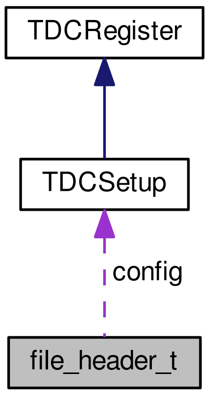
- include/Exception.h

5.3 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
- TDCSetup config

5.3.1 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

5.3.2 Field Documentation

5.3.2.1 TDCSetup file_header_t::config

5.3.2.2 uint32_t file_header_t::magic

5.3.2.3 uint32_t file_header_t::run_id

5.3.2.4 uint32_t file_header_t::spill_id

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

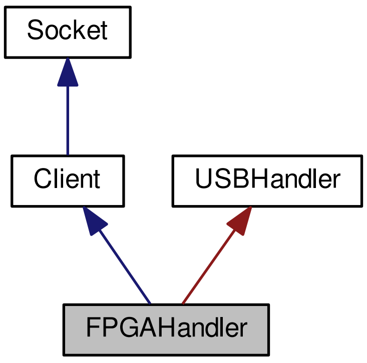
- include/FPGAHandler.h

5.4 FPGAHandler Class Reference

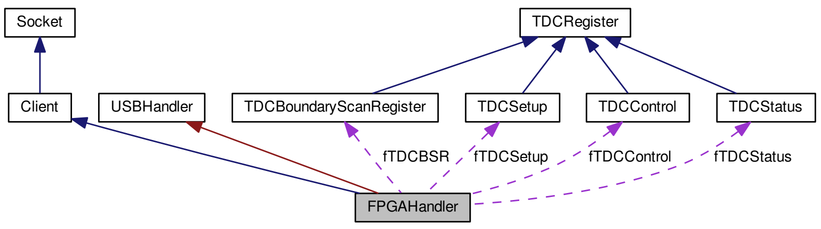
Driver for timing detectors' FPGA readout.

`#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 TDCSetup &c)

  Submit the HPTDC setup word as a TDCSetup object.
- TDCSetup GetConfiguration ()

  Retrieve the HPTDC setup word as a TDCSetup object.
- bool ErrorState ()
- void ReadBuffer ()
- SocketType GetType () const

  Socket actor type retrieval method.

Private Member Functions

- void SendConfiguration ()

  Set the setup word to the HPTDC internal setup register.
- void ReadConfiguration ()

  Read the setup word from the HPTDC internal setup register.
- void SetRegister (const TDCControl::RegisterName &r, unsigned int v)
- unsigned int ReadRegister (const TDCControl::RegisterName &r)
- void ReadBoundaryScanRegister ()

Private Attributes

- std::string fFilename
- std::ofstream fOutput
- bool fIsFileOpen
- bool fIsTDCInReadout
- TDCSetup fTDCSetup
- TDCControl fTDCControl
- TDCBoundaryScanRegister fTDCBSR
- TDCStatus fTDCStatus

Additional Inherited Members

5.4.1 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

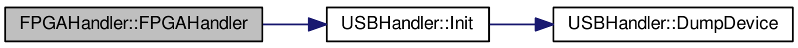
14 Apr 2015

5.4.2 Constructor & Destructor Documentation

5.4.2.1 FPGAHandler::FPGAHandler (int *port*, const char ∗ *dev*)

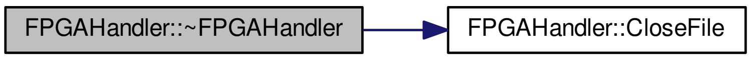
Bind to a FPGA through the USB protocol, and to the socket.

Here is the call graph for this function:



5.4.2.2 FPGAHandler::∼FPGAHandler ( ) `[virtual]`

Here is the call graph for this function:



5.4.3 Member Function Documentation

5.4.3.1 void FPGAHandler::CloseFile ( )

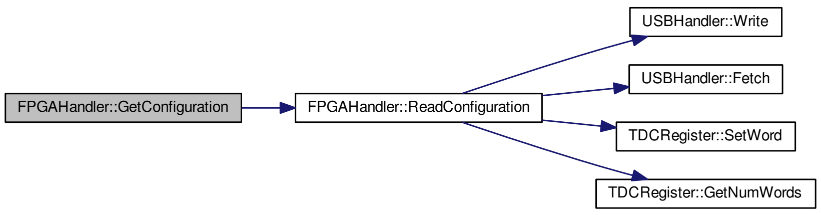
Close a previously opened output file used to store header/HPTDC events.

5.4.3.2 bool FPGAHandler::ErrorState ( )

5.4.3.3 TDCSetup FPGAHandler::GetConfiguration ( ) `[inline]`

Retrieve the HPTDC setup word as a TDCSetup object.

Here is the call graph for this function:



5.4.3.4 std::string FPGAHandler::GetFilename ( ) const [inline]

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

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

Socket actor type retrieval method.

Reimplemented from Client.

5.4.3.6 void FPGAHandler::OpenFile ( )

Open an output file to store header/HPTDC events.

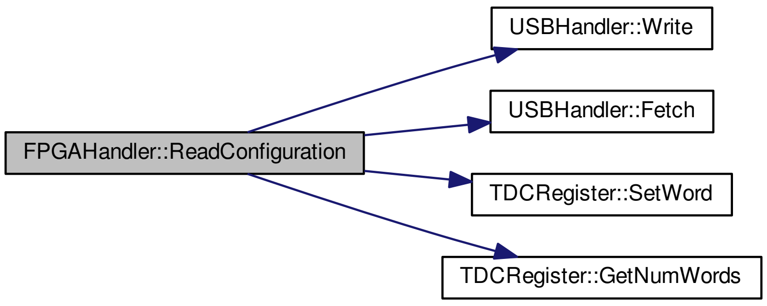
5.4.3.7 void FPGAHandler::ReadBoundaryScanRegister ( ) [private]

5.4.3.8 void FPGAHandler::ReadBuffer ( )

5.4.3.9 void FPGAHandler::ReadConfiguration ( ) [private]

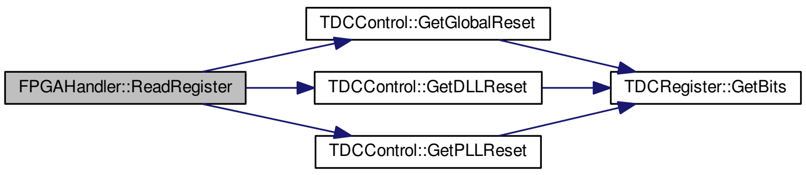
Read the setup word from the HPTDC internal setup register.

Here is the call graph for this function:



5.4.3.10 unsigned int FPGAHandler::ReadRegister (const TDCControl::RegisterName & *r*) [private]

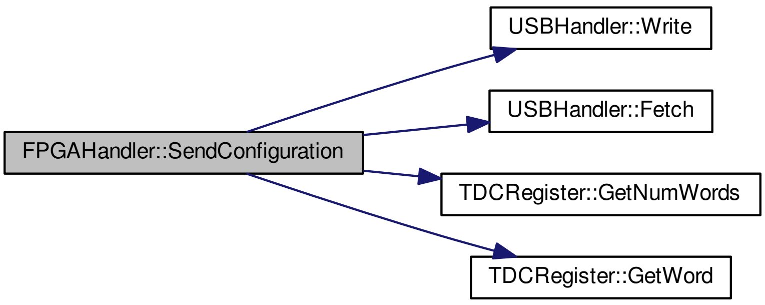
Here is the call graph for this function:



5.4.3.11 void FPGAHandler::SendConfiguration ( ) [private]

Set the setup word to the HPTDC internal setup register.

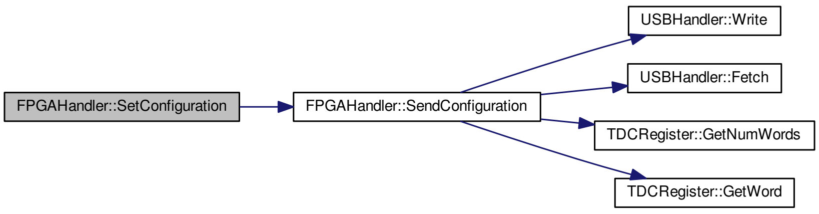
Here is the call graph for this function:



5.4.3.12 void FPGAHandler::SetConfiguration (const TDCSetup & *c*) [inline]

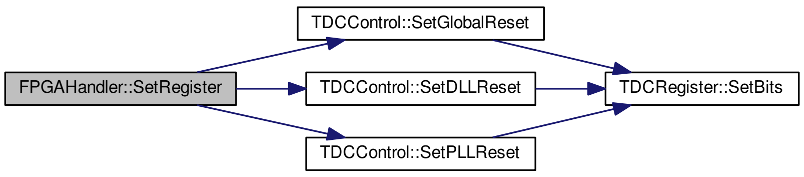
Submit the HPTDC setup word as a TDCSetup object.

Here is the call graph for this function:



5.4.3.13 void FPGAHandler::SetRegister (const TDCControl::RegisterName & *r*, unsigned int *v*) [private]

Here is the call graph for this function:



5.4.4 Field Documentation

5.4.4.1 std::string FPGAHandler::fFilename [private]

5.4.4.2 bool FPGAHandler::fIsFileOpen [private]

5.4.4.3 bool FPGAHandler::fIsTDCInReadout [private]

5.4.4.4 std::ofstream FPGAHandler::fOutput [private]

5.4.4.5 TDCBoundaryScanRegister FPGAHandler::fTDCBSR [private]

5.4.4.6 TDCControl FPGAHandler::fTDCControl [private]

5.4.4.7 TDCSetup FPGAHandler::fTDCSetup [private]

5.4.4.8 TDCStatus FPGAHandler::fTDCStatus [private]

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

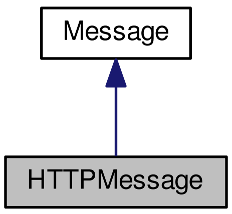
- include/FPGAHandler.h
- src/FPGAHandler.cpp

5.5 HTTPMessage Class Reference

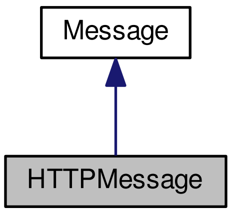
Message to be transmitted through a WebSocket protocol.

`#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

Private Attributes

- WebSocket ∗ fWS
- std::string fOriginalString

Additional Inherited Members

5.5.1 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`

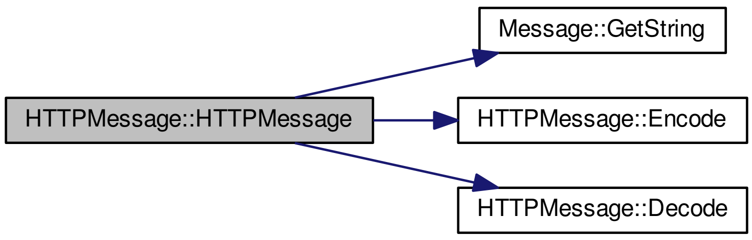
Date

1 Apr 2015

5.5.2 Constructor & Destructor Documentation

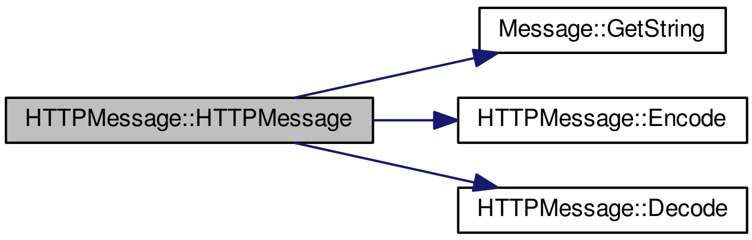
5.5.2.1 HTTPMessage::HTTPMessage (WebSocket ∗ *ws*, Message *m*, MessageAction *a*) `[inline]`

Here is the call graph for this function:



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

Here is the call graph for this function:



5.5.3 Member Function Documentation

5.5.3.1 void HTTPMessage::Decode ( ) `[inline]`

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

5.5.3.3 void HTTPMessage::Encode ( ) `[inline]`

5.5.3.4 MessageKey HTTPMessage::GetKey ( ) const `[inline]`

5.5.4 Field Documentation

5.5.4.1 std::string HTTPMessage::fOriginalString `[private]`

5.5.4.2 WebSocket∗ HTTPMessage::fWS `[private]`

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

- include/HTTPMessage.h

5.6 ListenerInfo Struct Reference

Information on a socket's listener.

`#include <Messenger.h>`

Data Fields

- std::string name
- Socket::SocketType type

5.6.1 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.

5.6.2 Field Documentation

5.6.2.1 std::string ListenerInfo::name

5.6.2.2 Socket::SocketType ListenerInfo::type

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

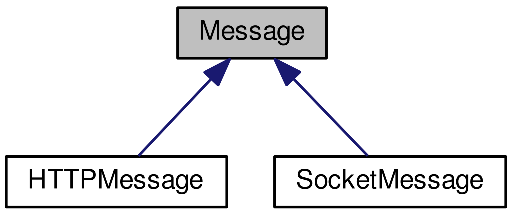
- include/Messenger.h

5.7 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

5.7.1 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

5.7.2 Constructor & Destructor Documentation

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

Void message constructor.

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

Construct a message from a string.

5.7.2.3 Message::Message (std::string *msg*) `[inline]`

Construct a message from a string.

5.7.2.4 virtual Message::∼Message ( ) [inline], [virtual]

5.7.3 Member Function Documentation

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

5.7.3.2 MessageKey Message::GetKey ( ) const [inline]

Placeholder for the MessageKey retrieval method.

5.7.3.3 std::string Message::GetString ( ) const [inline]

Retrieve the string carried by this message as a whole.

5.7.3.4 bool Message::IsFromWeb ( ) const [inline]

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

5.7.4 Field Documentation

5.7.4.1 std::string Message::fString [protected]

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

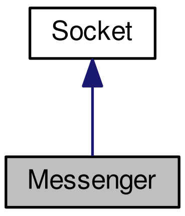
- include/Message.h

5.8 Messenger Class Reference

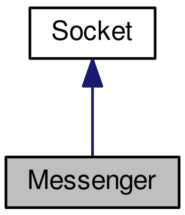
Base master object for the socket.

`#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.

Private Member Functions

- void AddClient ()

    Add a client to listen to.
- void DisconnectClient (int sid, MessageKey key, bool force=false)

    Disconnect a client.
- void SwitchClientType (int sid, Socket::SocketType type)
- void ProcessMessage (SocketMessage m, int sid)

    Process a message received from the socket.

Private Attributes

- WebSocket ∗ fWS
- int fNumAttempts
- std::vector< ListenerInfo > fListenersInfo

Additional Inherited Members

5.8.1 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

5.8.2 Constructor & Destructor Documentation

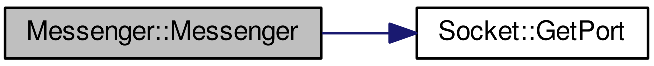
5.8.2.1 Messenger::Messenger ( )

Build a void master object or socket actor.

5.8.2.2 Messenger::Messenger (int *port*)

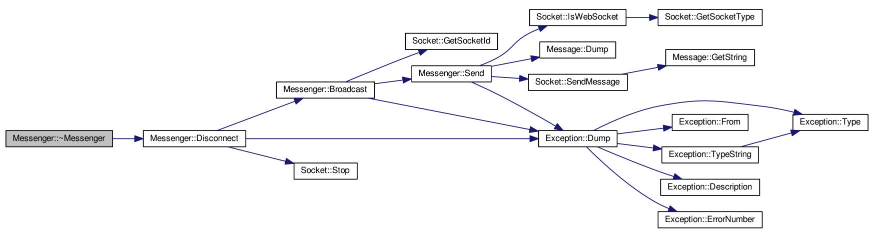
Build a master object to control the socket.

Here is the call graph for this function:



5.8.2.3 Messenger::∼Messenger ( )

Here is the call graph for this function:



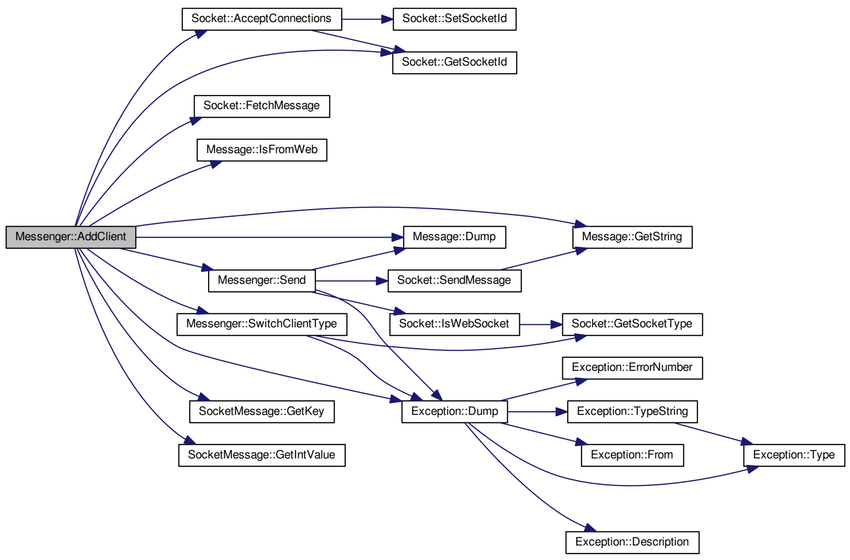
5.8.3 Member Function Documentation

5.8.3.1 void Messenger::AddClient ( ) `[private]`

Add a client to listen to.

Add one client to the list of socket actors to monitor for message retrieval/submission.

Here is the call graph for this function:



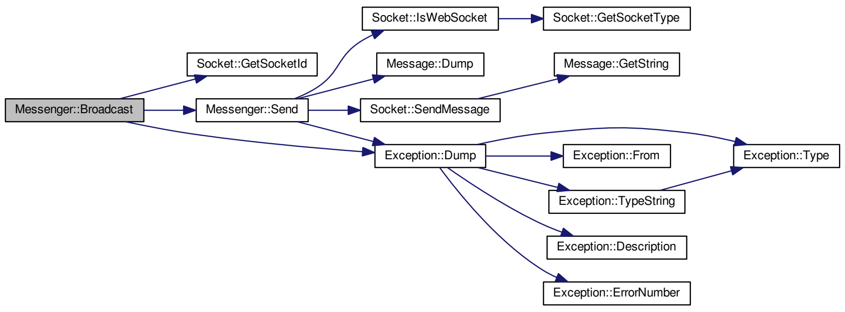
5.8.3.2 void Messenger::Broadcast (const Message & *m*) const

Emit a message to all clients connected through the socket.

Parameters

in	*m*	Message to transmit

Here is the call graph for this function:

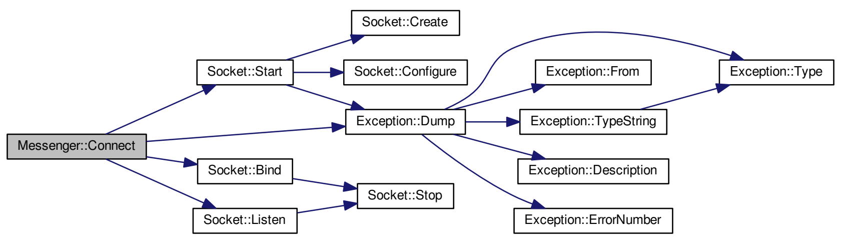


5.8.3.3 bool Messenger::Connect ( )

Connect the master to the socket.

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

Here is the call graph for this function:

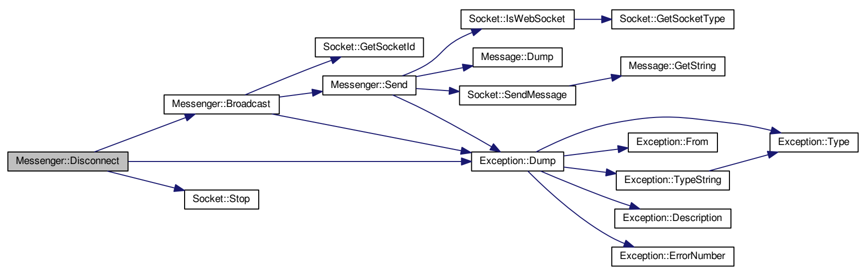


5.8.3.4 void Messenger::Disconnect ( )

Remove the master and destroy the socket.

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

Here is the call graph for this function:



5.8.3.5 void Messenger::DisconnectClient (int *sid,* MessageKey *key,* bool *force* = `false`) `[private]`

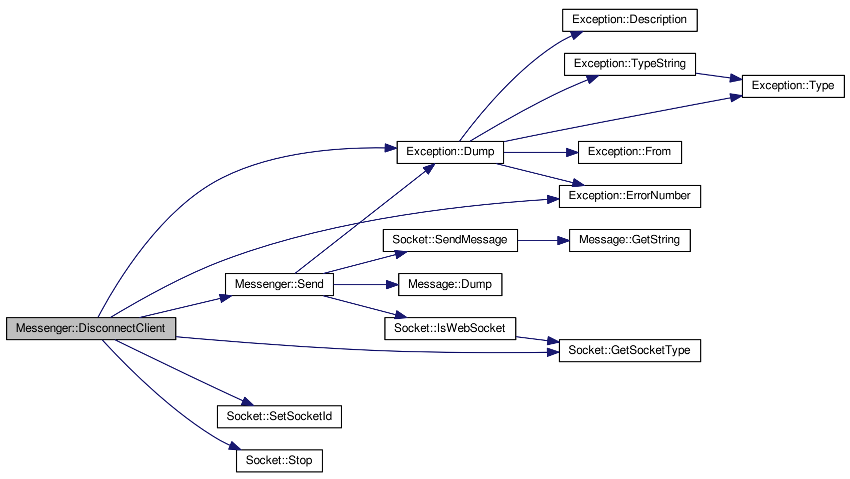
Disconnect a client.

Ask to a client to disconnect from this socket.

Parameters

`in`	*sid*	Unique identifier of the client to disconnect
`in`	*key*	Key to the message to transmit for disconnection
`in`	*force*	Do we need to force the client out of this socket ?

Here is the call graph for this function:



5.8.3.6 SocketType Messenger::GetType ( ) const [inline]

Socket actor type retrieval method.

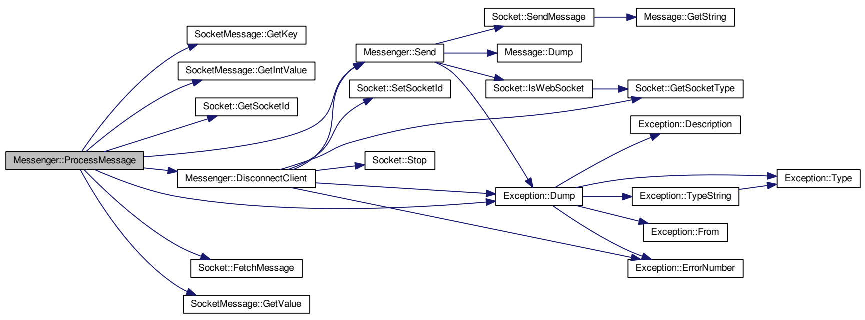
5.8.3.7 void Messenger::ProcessMessage (SocketMessage *m*, int *sid*) [private]

Process a message received from the socket.

Parameters

in	*Unique*	identifier of the client sending the message

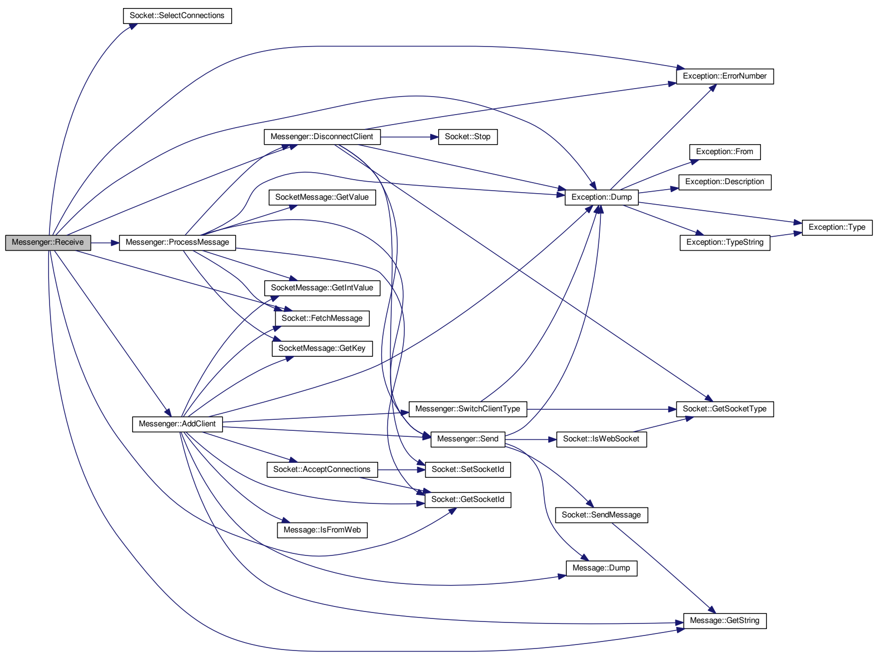
Here is the call graph for this function:



5.8.3.8 void Messenger::Receive ( )

Handle a message reception from a client.

Here is the call graph for this function:



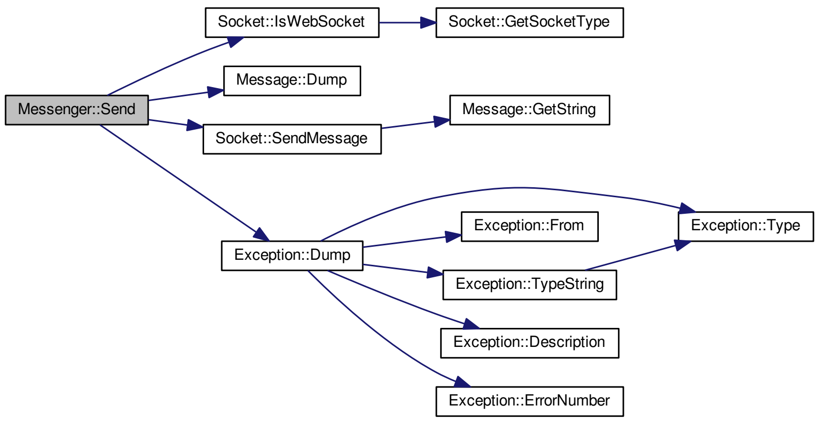
5.8.3.9 void Messenger::Send (const Message & *m*, int *sid*) const `[inline]`

Send any type of message to any client.

Parameters

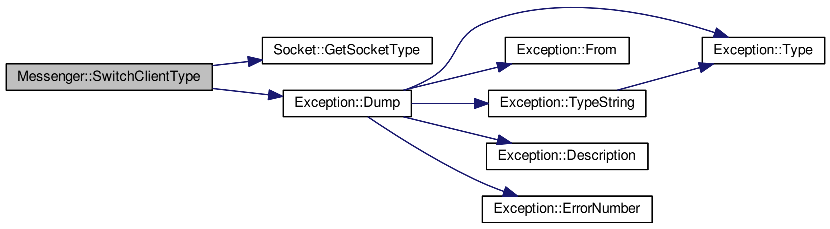
`in`	*m*	Message to transmit
`in`	*sid*	Unique identifier of the client on this socket

Here is the call graph for this function:



5.8.3.10 void Messenger::SwitchClientType (int *sid*, Socket::SocketType *type*) `[private]`

Here is the call graph for this function:



5.8.4 Field Documentation

5.8.4.1 std::vector< ListenerInfo > Messenger::fListenersInfo `[private]`

5.8.4.2 int Messenger::fNumAttempts `[private]`

5.8.4.3 WebSocket* Messenger::fWS `[private]`

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

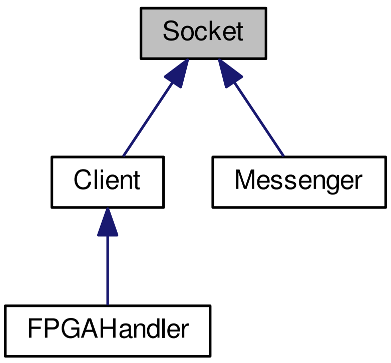
- include/Messenger.h
- src/Messenger.cpp

5.9 Socket Class Reference

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

`#include <Socket.h>`

Inheritance diagram for Socket:



Public Types

- enum SocketType {
  INVALID =-1, MASTER =0, WEBSOCKET_CLIENT, CLIENT,
  DETECTOR }

  Type of actor playing a role on the socket.
- typedef std::set< std::pair< int, SocketType > > SocketCollection

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()

Private Member Functions

- void Create ()

  Create an endpoint for communication.
- void Configure ()

  Configure the socket object for communication.

Private Attributes

- int fSocketId
- struct sockaddr_in fAddress

5.9.1 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

5.9.2 Member Typedef Documentation

5.9.2.1 typedef std::set< std::pair<int,SocketType> > Socket::SocketCollection

5.9.3 Constructor & Destructor Documentation

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

5.9.3.2 Socket::Socket (int *port*)

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

5.9.4 Member Function Documentation

5.9.4.1 void Socket::AcceptConnections (Socket & *socket*)

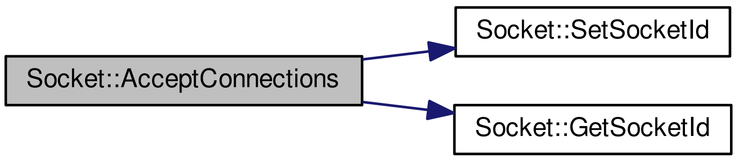
Accept connection from a client.

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

Parameters

`in,out`	*socket*	Master/client object to enable on the socket

Here is the call graph for this function:



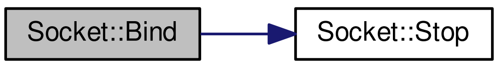
5.9.4.2 void Socket::Bind ( ) [protected]

Bind a name to a socket.

Returns

Success of the operation

Here is the call graph for this function:



5.9.4.3 void Socket::Configure ( ) [private]

Configure the socket object for communication.

5.9.4.4 void Socket::Create ( ) [private]

Create an endpoint for communication.

5.9.4.5 void Socket::DumpConnected ( ) const

5.9.4.6 Message Socket::FetchMessage (int *id* = -1) const [protected]

Receive a message from a socket.

Returns

Received message as a std::string

5.9.4.7 int Socket::GetPort ( ) const [inline]

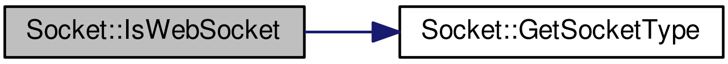
Retrieve the port used for this socket.

5.9.4.8 int Socket::GetSocketId ( ) const [inline]

5.9.4.9 SocketType Socket::GetSocketType (int *sid*) const [inline]

5.9.4.10 bool Socket::IsWebSocket (int *sid*) const [inline]

Here is the call graph for this function:

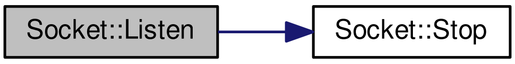


5.9.4.11 void Socket::Listen (int *maxconn*) [protected]

Listen to incoming messages.

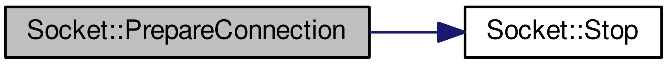
Set the socket to listen to any message coming from outside

Here is the call graph for this function:



5.9.4.12 void Socket::PrepareConnection ( ) [protected]

Here is the call graph for this function:



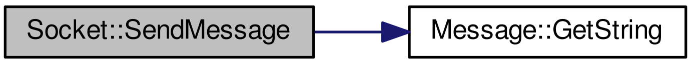
5.9.4.13 void Socket::SelectConnections ( )

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

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

Send a message on a socket.

Here is the call graph for this function:



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

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

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

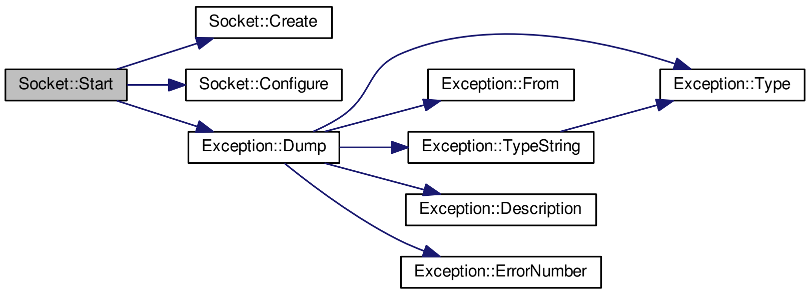
Start the socket.

Launch all mandatory operations to set the socket to be used

Returns

Success of the operation

Here is the call graph for this function:



5.9.4.18 void Socket::Stop ( )

Terminates the socket and all attached communications.

5.9.5 Field Documentation

5.9.5.1 struct sockaddr_in Socket::fAddress `[private]`

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

5.9.5.3 fd_set Socket::fMaster `[protected]`

Master file descriptor list.

5.9.5.4 int Socket::fPort `[protected]`

5.9.5.5 fd_set Socket::fReadFds `[protected]`

Temp file descriptor list for select()

5.9.5.6 int Socket::fSocketId `[private]`

A file descriptor for this socket, if *Create* was performed beforehand.

5.9.5.7 SocketCollection Socket::fSocketsConnected `[protected]`

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

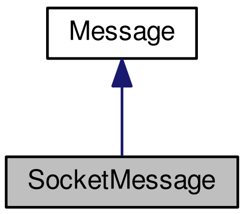
- include/Socket.h
- src/Socket.cpp

5.10 SocketMessage Class Reference

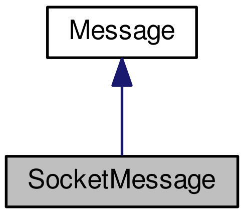
Socket-passed message type.

`#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 ()
- void SetKeyValue (const MessageKey &key, const char ∗value)

  String-valued message.
- void SetKeyValue (const MessageKey &key, int int_value)

  Send an integer-valued message.
- void SetKeyValue (const MessageKey &key, float float_value)

  Float-valued message.
- void SetKeyValue (const MessageKey &key, double double_value)

  Double-valued message.
- std::string GetString () const

  Extract the whole key:value message.
- MessageKey GetKey () const

  Extract the message's key.
- std::string GetValue () const

  Extract the message's string value.
- int GetIntValue () const

Extract the message's integer value.

- VectorValue GetVectorValue () const

  Extract the message's vector of string value.

- void Dump (std::ostream &os=std::cout) const

Private Member Functions

- MessageMap Object () const
- std::string String () const

Private Attributes

- MessageMap fMessage

Additional Inherited Members

5.10.1 Detailed Description

Socket-passed message type.

Author

Laurent Forthomme `laurent.forthomme@cern.ch`

Date

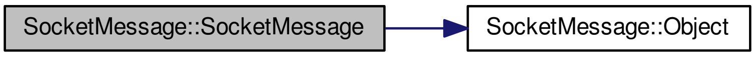
26 Mar 2015

5.10.2 Constructor & Destructor Documentation

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

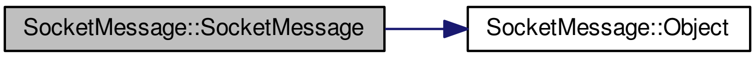
5.10.2.2 SocketMessage::SocketMessage (const Message & *msg*) `[inline]`

Here is the call graph for this function:



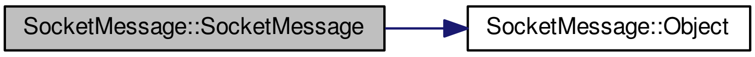
5.10.2.3 SocketMessage::SocketMessage (const char ∗ *msg_s*) [inline]

Here is the call graph for this function:



5.10.2.4 SocketMessage::SocketMessage (std::string *msg_s*) [inline]

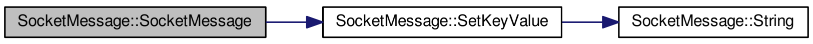
Here is the call graph for this function:



5.10.2.5 SocketMessage::SocketMessage (const MessageKey & *key*) [inline]

Construct a socket message out of a key.

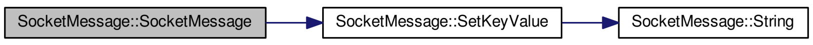
Here is the call graph for this function:



5.10.2.6 SocketMessage::SocketMessage (const MessageKey & *key,* const char ∗ *value*) [inline]

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

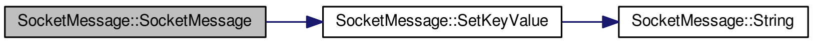
Here is the call graph for this function:



5.10.2.7 SocketMessage::SocketMessage (const MessageKey & *key*, std::string *value*) [inline]

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

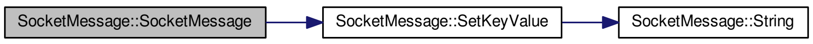
Here is the call graph for this function:



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

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

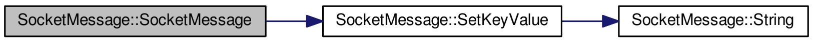
Here is the call graph for this function:



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

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

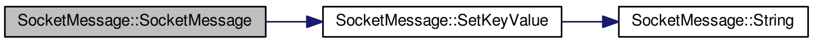
Here is the call graph for this function:



5.10.2.10 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:



5.10.2.11 SocketMessage::SocketMessage (MessageMap *msg_m*) `[inline]`

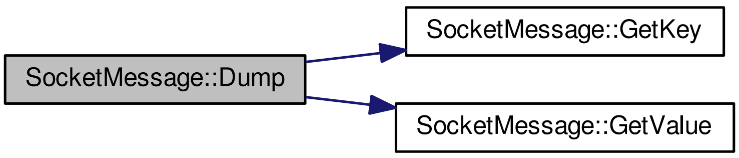
Construct a socket message out of a map of key/string-type value.

5.10.2.12 SocketMessage::∼SocketMessage ( ) `[inline]`

5.10.3 Member Function Documentation

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

Here is the call graph for this function:



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

Extract the message's integer value.

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

Extract the message's key.

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

Extract the whole key:value message.

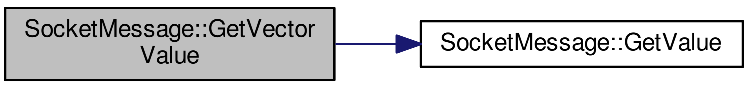
5.10.3.5 std::string SocketMessage::GetValue ( ) const `[inline]`

Extract the message's string value.

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

Extract the message's vector of string value.

Here is the call graph for this function:

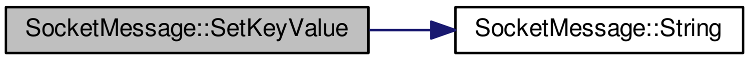


5.10.3.7 MessageMap SocketMessage::Object ( ) const [inline], [private]

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

String-valued message.

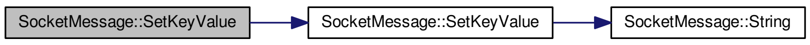
Here is the call graph for this function:



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

Send an integer-valued message.

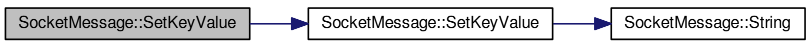
Here is the call graph for this function:



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

Float-valued message.

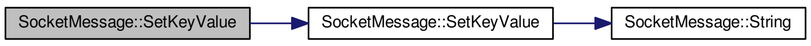
Here is the call graph for this function:



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

Double-valued message.

Here is the call graph for this function:



5.10.3.12 std::string SocketMessage::String ( ) const `[inline], [private]`

5.10.4 Field Documentation

5.10.4.1 MessageMap SocketMessage::fMessage `[private]`

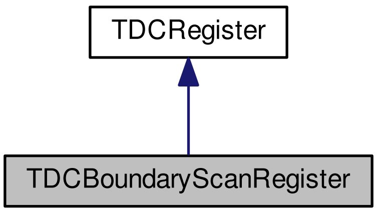
The documentation for this class was generated from the following file:

- include/SocketMessage.h

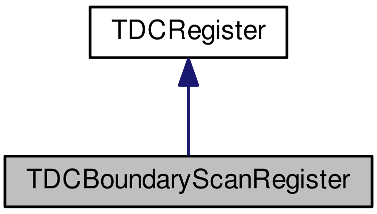
5.11 TDCBoundaryScanRegister Class Reference

`#include <TDCBoundaryScan.h>`

Inheritance diagram for TDCBoundaryScanRegister:



Collaboration diagram for TDCBoundaryScanRegister:



Public Member Functions

- TDCBoundaryScanRegister ()
- TDCBoundaryScanRegister (const TDCBoundaryScanRegister &bs)
- void SetConstantValues ()

Additional Inherited Members

5.11.1 Detailed Description

Author

Laurent Forthomme `laurent.forthomme@cern.ch`

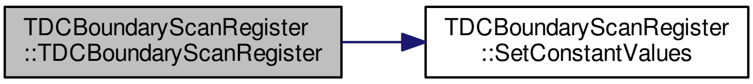
Date

24 Apr 2015

5.11.2 Constructor & Destructor Documentation

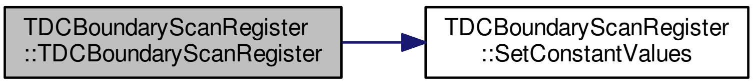
5.11.2.1 TDCBoundaryScanRegister::TDCBoundaryScanRegister ( ) `[inline]`

Here is the call graph for this function:


TDCBoundaryScanRegister ::TDCBoundaryScanRegister
TDCBoundaryScanRegister ::SetConstantValues

5.11.2.2 TDCBoundaryScanRegister::TDCBoundaryScanRegister (const TDCBoundaryScanRegister & *bs*) [inline]

Here is the call graph for this function:


TDCBoundaryScanRegister ::TDCBoundaryScanRegister
TDCBoundaryScanRegister ::SetConstantValues

5.11.3 Member Function Documentation

5.11.3.1 void TDCBoundaryScanRegister::SetConstantValues ( ) [inline], [virtual]

Ensure that the critical constant values are properly set in the register word

Implements TDCRegister.

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

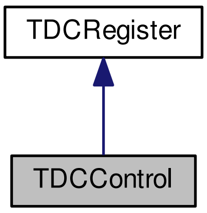
- include/TDCBoundaryScan.h

5.12 TDCControl Class Reference

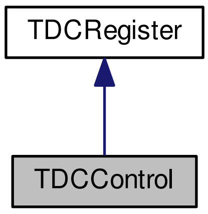
Control word to be sent to the HPTDC chip.

`#include <TDCControl.h>`

Inheritance diagram for TDCControl:



Collaboration diagram for TDCControl:



Public Types

- enum EnablePattern
- enum RegisterName { R_EnablePattern, R_GlobalReset, R_DLLReset, R_PLLReset }

Public Member Functions

- TDCControl ()
- TDCControl (const TDCControl &c)
- void SetEnablePattern (const EnablePattern &ep)
- EnablePattern GetEnablePattern () const
- void SetGlobalReset (const bool gr=true)
- bool GetGlobalReset () const
- void SetDLLReset (const bool dr=true)
- bool GetDLLReset () const
- void SetPLLReset (const bool pr=true)
- bool GetPLLReset () const
- void EnableChannel (unsigned int id)
- void EnableAllChannels ()
- void DisableChannel (unsigned int id)
- void DisableAllChannels ()
- void Dump (int verb=1, std::ostream &os=std::cout) const
- void SetConstantValues ()

Private Member Functions

- void SetControlParity (const bool cp=true)

Static Private Attributes

- static const bit kEnablePattern = 0
- static const bit kGlobalReset = 4
- static const bit kEnableChannel = 5
- static const bit kDLLReset = 37
- static const bit kPLLReset = 38
- static const bit kControlParity = 39

Additional Inherited Members

5.12.1 Detailed Description

Control word to be sent to the HPTDC chip.

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

Author

Laurent Forthomme `laurent.forthomme@cern.ch`

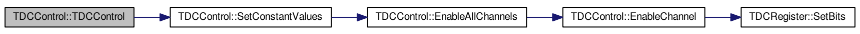
Date

24 Apr 2015

5.12.2 Constructor & Destructor Documentation

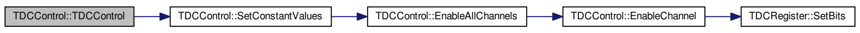
5.12.2.1 TDCControl::TDCControl ( ) `[inline]`

Here is the call graph for this function:


TDCControl::TDCControl
TDCControl::SetConstantValues
TDCControl::EnableAllChannels
TDCControl::EnableChannel
TDCRegister::SetBits

5.12.2.2 TDCControl::TDCControl (const TDCControl & *c*) `[inline]`

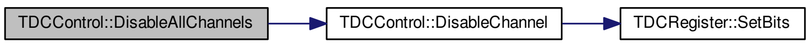
Here is the call graph for this function:


TDCControl::TDCControl
TDCControl::SetConstantValues
TDCControl::EnableAllChannels
TDCControl::EnableChannel
TDCRegister::SetBits

5.12.3 Member Function Documentation

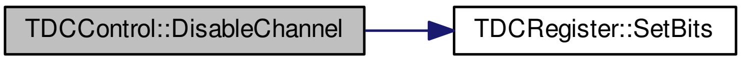
5.12.3.1 void TDCControl::DisableAllChannels ( ) `[inline]`

Here is the call graph for this function:



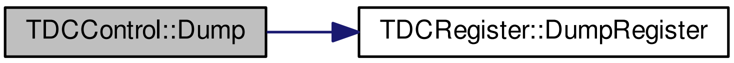
5.12.3.2 void TDCControl::DisableChannel (unsigned int *id*) [inline]

Here is the call graph for this function:



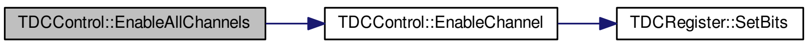
5.12.3.3 void TDCControl::Dump (int *verb* = 1, std::ostream & *os* = std::cout) const [inline]

Here is the call graph for this function:



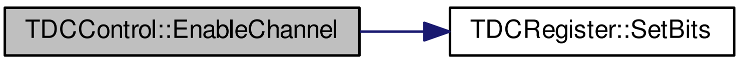
5.12.3.4 void TDCControl::EnableAllChannels ( ) [inline]

Here is the call graph for this function:



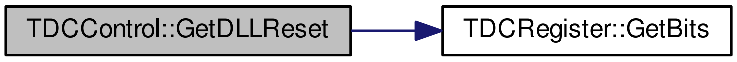
5.12.3.5 void TDCControl::EnableChannel (unsigned int *id*) [inline]

Here is the call graph for this function:



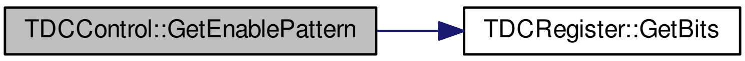
5.12.3.6 bool TDCControl::GetDLLReset ( ) const [inline]

Here is the call graph for this function:



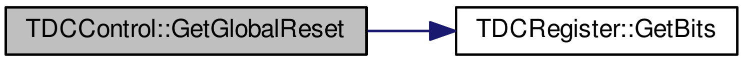
5.12.3.7 EnablePattern TDCControl::GetEnablePattern ( ) const [inline]

Here is the call graph for this function:



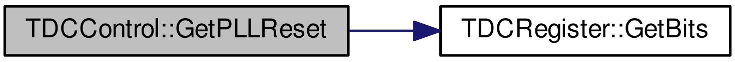
5.12.3.8 bool TDCControl::GetGlobalReset ( ) const [inline]

Here is the call graph for this function:



5.12.3.9 bool TDCControl::GetPLLReset ( ) const [inline]

Here is the call graph for this function:

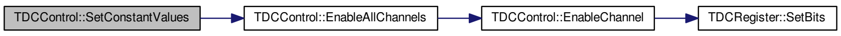


5.12.3.10 void TDCControl::SetConstantValues ( ) [inline], [virtual]

Ensure that the critical constant values are properly set in the register word

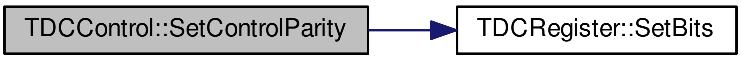
Implements TDCRegister.

Here is the call graph for this function:


TDCControl::SetConstantValues
TDCControl::EnableAllChannels
TDCControl::EnableChannel
TDCRegister::SetBits

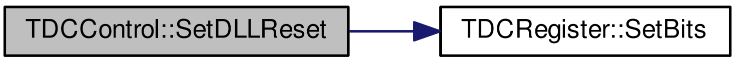
5.12.3.11 void TDCControl::SetControlParity (const bool *cp* = true) [inline], [private]

Here is the call graph for this function:



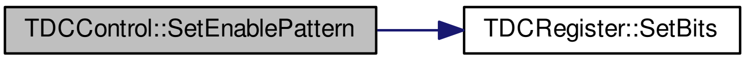
5.12.3.12 void TDCControl::SetDLLReset (const bool *dr* = true) [inline]

Here is the call graph for this function:



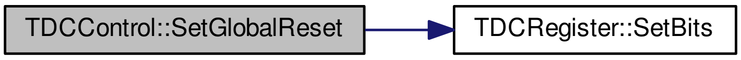
5.12.3.13 void TDCControl::SetEnablePattern (const EnablePattern & *ep*) [inline]

Here is the call graph for this function:



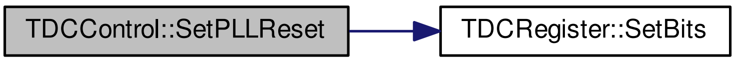
5.12.3.14 void TDCControl::SetGlobalReset (const bool *gr* = true) [inline]

Here is the call graph for this function:



5.12.3.15 void TDCControl::SetPLLReset (const bool *pr* = true) [inline]

Here is the call graph for this function:



5.12.4 Field Documentation

5.12.4.1 const bit TDCControl::kControlParity = 39 [static], [private]

5.12.4.2 const bit TDCControl::kDLLReset = 37 [static], [private]

5.12.4.3 const bit TDCControl::kEnableChannel = 5 [static], [private]

5.12.4.4 const bit TDCControl::kEnablePattern = 0 [static], [private]

5.12.4.5 const bit TDCControl::kGlobalReset = 4 [static], [private]

5.12.4.6 const bit TDCControl::kPLLReset = 38 `[static], [private]`

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

- include/TDCControl.h

5.13 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.

Private Attributes

- uint32_t fWord

5.13.1 Detailed Description

HPTDC event parser.

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

Author

Laurent Forthomme `laurent.forthomme@cern.ch`

Date

20 Apr 2015

5.13.2 Constructor & Destructor Documentation

5.13.2.1 TDCEvent::TDCEvent (const uint32_t & *word*) `[inline]`

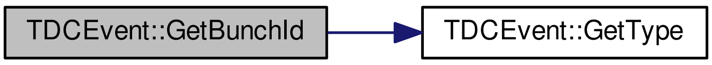
5.13.2.2 virtual TDCEvent::∼TDCEvent ( ) `[inline], [virtual]`

5.13.3 Member Function Documentation

5.13.3.1 uint16_t TDCEvent::GetBunchId ( ) const `[inline]`

Bunch identifier of trigger (or trigger time tag)

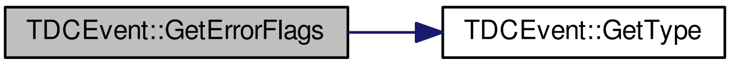
Here is the call graph for this function:



5.13.3.2 uint16_t TDCEvent::GetErrorFlags ( ) const `[inline]`

Return error flags if an error condition has been detected.

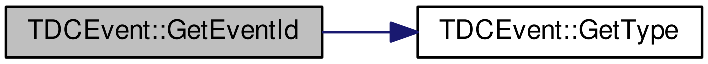
Here is the call graph for this function:



5.13.3.3 uint16_t TDCEvent::GetEventId ( ) const [inline]

Event identifier from event counter.

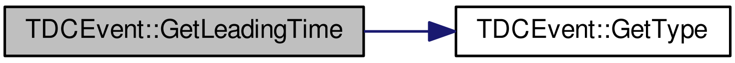
Here is the call graph for this function:



5.13.3.4 uint32_t TDCEvent::GetLeadingTime (bool *pair* = false) const [inline]

Leading edge measurement in programmed time resolution.

Here is the call graph for this function:



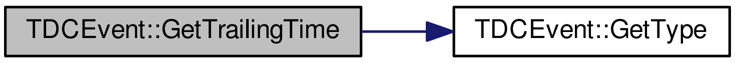
5.13.3.5 unsigned int TDCEvent::GetTDCId ( ) const [inline]

Programmed identifier of master TDC.

5.13.3.6 uint32_t TDCEvent::GetTrailingTime ( ) const [inline]

Trailing edge measurement in programmed time resolution.

Here is the call graph for this function:



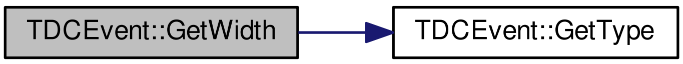
5.13.3.7 EventType TDCEvent::GetType ( ) const [inline]

Type of packet read out from the TDC.

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

Width of pulse in programmed time resolution.

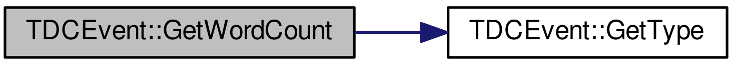
Here is the call graph for this function:



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

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

Here is the call graph for this function:



5.13.4 Field Documentation

5.13.4.1 uint32_t TDCEvent::fWord [private]

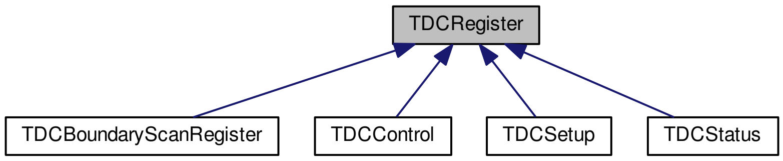
The documentation for this class was generated from the following file:

- include/TDCEvent.h

5.14 TDCRegister Class Reference

```
#include <TDCRegister.h>
```

Inheritance diagram for TDCRegister:



Public Types

- typedef uint16_t bit

  LSB index.
- typedef uint32_t word_t

  Unit of the TDC register word to be successfully contained on any machine.

Public Member Functions

- TDCRegister (const unsigned int size)
- TDCRegister (const unsigned int size, const TDCRegister &r)
- virtual ∼TDCRegister ()
- void SetWord (const unsigned int i, const word_t word)

  Set one bit(s) subset in the register word.
- word_t GetWord (const unsigned int i) const

  Retrieve one subset from the register word.
- uint8_t GetNumWords () const

  Number of words in the register.
- void DumpRegister (std::ostream &os=std::cout, const bit max_bits=-1) const
- virtual void SetConstantValues ()=0

Protected Member Functions

- void SetBits (uint16_t lsb, uint16_t word, uint8_t size)

  Set bits in the register word.
- uint16_t GetBits (uint16_t lsb, uint8_t size) const

  Extract bits from the register word.
- void Clear ()

  Set all bits in this register to '0'.

Protected Attributes

- word_t ∗ fWord

  Pointer to this register's word.
- unsigned int fNumWords
- unsigned int fWordSize

  Number of bits in this register.

5.14.1 Member Typedef Documentation

5.14.1.1 typedef uint16_t **TDCRegister::bit**

LSB index.

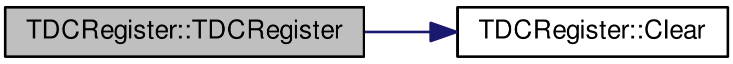
5.14.1.2 typedef uint32_t **TDCRegister::word_t**

Unit of the TDC register word to be successfully contained on any machine.

5.14.2 Constructor & Destructor Documentation

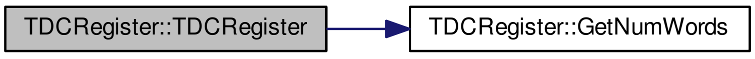
5.14.2.1 TDCRegister::TDCRegister (const unsigned int *size*) `[inline]`

Here is the call graph for this function:



5.14.2.2 TDCRegister::TDCRegister (const unsigned int *size*, const **TDCRegister** & *r*) `[inline]`

Here is the call graph for this function:



5.14.2.3 virtual TDCRegister::∼TDCRegister ( ) `[inline]`, `[virtual]`

5.14.3 Member Function Documentation

5.14.3.1 void TDCRegister::Clear ( ) `[inline]`, `[protected]`

Set all bits in this register to '0'.

5.14.3.2 void TDCRegister::DumpRegister (std::ostream & *os* = `std::cout`, const bit *max_bits* = `-1`) const `[inline]`

5.14.3.3 uint16_t TDCRegister::GetBits (uint16_t *lsb*, uint8_t *size*) const [inline], [protected]

Extract bits from the register word.

Extract a fixed amount of bits from the full register word

Parameters

in	*lsb*	Least significant bit of the word to retrieve
in	*size*	Size of the word to retrieve

5.14.3.4 uint8_t TDCRegister::GetNumWords ( ) const [inline]

Number of words in the register.

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

5.14.3.5 word_t TDCRegister::GetWord (const unsigned int *i*) const [inline]

Retrieve one subset from the register word.

5.14.3.6 void TDCRegister::SetBits (uint16_t *lsb*, uint16_t *word*, uint8_t *size*) [inline], [protected]

Set bits in the register word.

Set a fixed amount of bits in the full register word

Parameters

in	*lsb*	Least significant bit of the word to set
in	*word*	Word to set
in	*size*	Size of the word to set

5.14.3.7 virtual void TDCRegister::SetConstantValues ( ) [pure virtual]

Ensure that the critical constant values are properly set in the register word

Implemented in TDCSetup, TDCControl, TDCBoundaryScanRegister, and TDCStatus.

5.14.3.8 void TDCRegister::SetWord (const unsigned int *i*, const word_t *word*) [inline]

Set one bit(s) subset in the register word.

5.14.4 Field Documentation

5.14.4.1 unsigned int TDCRegister::fNumWords [protected]

Number of words to fit the *fWordSize* bits of this register to this object

5.14.4.2 word_t* TDCRegister::fWord [protected]

Pointer to this register's word.

5.14.4.3 unsigned int TDCRegister::fWordSize [protected]

Number of bits in this register.

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

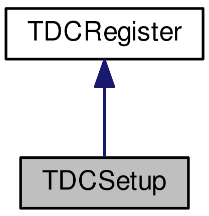
- include/TDCRegister.h

5.15 TDCSetup Class Reference

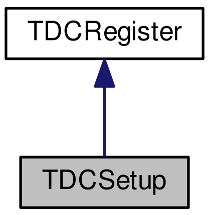
Setup word to be sent to the HPTDC chip.

`#include <TDCSetup.h>`

Inheritance diagram for TDCSetup:



Collaboration diagram for TDCSetup:



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, ReadoutState↩
Error =0x80,
SetupParityError =0x100, ControlParityError =0x200, JTAGInstructionParityError =0x400 }
- enum DLLSpeedMode { DLL_40MHz =0x0, DLL_160MHz =0x1, DLL_320MHz =0x2, DLL_Illegal =0x3 }
- enum SerialClockSource { Serial_pll_clock_80 =0x0, Serial_pll_clock_160 =0x1, Serial_pll_clock_40 =0x2, Serial_aux_clock =0x3 }
- enum IOClockSource { IO_clock_40 =0x0, IO_pll_clock_80 =0x1, IO_pll_clock_160 =0x2, IO_aux_clock =0x3 }
- enum CoreClockSource { Core_clock_40 =0x0, Core_pll_clock_80 =0x1, Core_pll_clock_160 =0x2, Core_↩
aux_clock =0x3 }
- enum DLLClockSource {
DLL_clock_40 =0x0, DLL_pll_clock_40 =0x1, DLL_pll_clock_160 =0x2, DLL_pll_clock_320 =0x3,
DLL_aux_clock =0x4 }
- enum ReadoutSpeed { RO_Fixed =0x0, RO_pll_80Mbits_s =0x1 }
- enum SerialStrobeType { SS_NoStrobe =0x0, SS_DSStrobe =0x1, SS_LeadingTrailingStrobe =0x2, SS_↩
LeadingEdge =0x3 }
- enum ReadoutSingleCycleSpeed {
RSC_40Mbits_s =0x0, RSC_20Mbits_s =0x1, RSC_10Mbits_s =0x2, RSC_5Mbits_s =0x3,
RSC_2p5Mbits_s =0x4, RSC_1p25Mbits_s =0x5, RSC_625kbits_s =0x6, RSC_312p5kbits_s =0x7 }

Public Member Functions

- TDCSetup ()
- TDCSetup (const TDCSetup &c)
- void SetEnableErrorMark (const bool em)

  Mark events with error if global error signal is set.
- bool GetEnableErrorMark () const
- void SetEnableErrorBypass (const bool eb)

  Bypass TDC chip if global error signal is set.
- bool GetEnableErrorBypass () const
- void SetEnableError (const uint16_t &err)

  Enable internal error types for generation of global error signals.
- uint16_t GetEnableError () const
- void SetEnableSerial (const bool es)

  Enable of serial read-out (otherwise parallel read-out)
- bool GetEnableSerial () const
- void SetEnableJTAGReadout (const bool jr)

  Enable of read-out via JTAG.
- bool GetEnableJTAGReadout () const
- void SetReadoutFIFOSize (int rfs)

  Effective size of readout FIFO.
- int GetReadoutFIFOSize () const
- void SetRejectCountOffset (uint16_t rco)

  Set the offset in reject counter (defines reject latency together with coarse count offset)
- uint16_t GetRejectCountOffset () const

  Extract the offset in reject counter.
- void SetSearchWindow (uint16_t sw)

  Set the search window (in multiples of clock cycles: 0=25 ns, 1=50 ns, ...)

- uint16_t GetSearchWindow () const

  Extract the search window (in multiples of clock cycles: 0=25 ns, 1=50 ns, ...)
- void SetMatchWindow (uint16_t mw)

  Set the matching window (in multiples of clock cycles: 0=25 ns, 1=50 ns, ...)
- uint16_t GetMatchWindow () const

  Extract the matching window (in multiples of clock cycles: 0=25 ns, 1=50 ns, ...)
- void SetEdgeResolution (const EdgeResolution r)
- EdgeResolution GetEdgeResolution () const
- void SetMaxEventSize (int sz=-1)

  Set the maximum number of hits per event.
- uint8_t GetMaxEventSize () const

  Extract the maximum number of hits per event.
- void SetRejectFIFOFull (const bool rej=true)

  Reject hits when readout FIFO full.
- bool GetRejectFIFOFull () const

  Are hits rejected when readout FIFO is full?
- void SetEnableReadoutOccupancy (const bool ro=true)

  Enable the readout of buffer occupancies for each event (for debugging purposes)
- bool GetEnableReadoutOccupancy () const
- void SetEnableReadoutSeparator (const bool ro=true)

  Enable the readout of separators for each event (for debugging purposes, valid if readout of occupancies is enabled)
- bool GetEnableReadoutSeparator () const
- void SetEventCountOffset (uint16_t eco)

  Set offset for the event counter.
- void SetTriggerCountOffset (uint16_t tco)

  Set offset for the trigger time tag counter to set effective trigger latency.
- uint16_t GetTriggerCountOffset () const

  Extract trigger time tag count offset.
- void SetChannelOffset (int channel, uint16_t offset)

  Set the time offset for one single channel.
- uint16_t GetChannelOffset (int channel) const

  Return the offset for one single channel.
- void SetAllChannelsOffset (uint16_t offset)

  Set the time offset for all channels.
- void SetCoarseCountOffset (uint16_t cco)

  Set offset for the coarse time counter.
- uint16_t GetCoarseCountOffset () const

  Extract offset for the coarse time counter.
- void SetDLLAdjustment (int tap, uint8_t adj)

  Set the DLL taps adjustments with a resolution of $\sim$10 ps.
- uint8_t GetDLLAdjustment (int tap) const

  Set the adjustment of DLL taps.
- void SetAllTapsDLLAdjustment (uint8_t adj)

  Extract the adjustment of DLL taps.
- void SetRCAdjustment (int tap, uint8_t adj)

  Set the adjustment of the RC delay line.
- uint8_t GetRCAdjustment (int tap)

  Extract the adjustment of the RC delay line.
- void SetWidthResolution (const WidthResolution r)

  Set the pulse width resolution when paired measurements are performed.
- WidthResolution GetWidthResolution () const

Extract the pulse width resolution when paired measurements are performed.
- void SetVernierOffset (const uint8_t vo)

  Set the offset in vernier decoding.
- uint8_t GetVernierOffset () const

  Extract the offset in vernier decoding.
- void SetDeadTime (const DeadTime dt)

  Channel dead time between hits.
- DeadTime GetDeadTime () const
- void SetTestInvert (const bool ti=true)

  Automatic inversion of test pattern. Only used during production testing.
- bool GetTestInvert () const
- void SetTestMode (const bool tm=true)

  Test mode where hit data are taken from coretest. Only used during production testing.
- bool GetTestMode () const
- 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 SetLeadingMode (const bool lead=true)

  Enable the detection of leading edges.
- bool GetLeadingMode () const

  Extract the status for the detection of leading edges.
- void SetTriggerMatchingMode (const bool trig=true)

  Set the enable status of trigger matching mode.
- bool GetTriggerMatchingMode () const

  Extract the enable status of trigger matching mode.
- void SetEdgesPairing (const bool pair=true)

  Enable the pairing of leading and trailing edges (overrides individual enable of leading/trailing edges)
- bool GetEdgesPairing () const
- void SetSetupParity (const bool sp=true)

  Set the parity of setup data (should be an even parity)
- bool GetSetupParity () const

  Extract the parity of setup data (should be an even parity)
- void SetConstantValues ()

  Ensure that the critical constant values are properly set in the setup word.
- uint16_t GetTriggerLatency () const

  Effective trigger latency in number of clock cycles (when no counter roll-over is used)
- void Dump (int verb=1, std::ostream &os=std::cout) const

Private Member Functions

- void SetReadoutSingleCycleSpeed (const ReadoutSingleCycleSpeed rscs=RSC_40Mbits_s)

  Serial transmission speed in single cycle mode.
- void SetSerialDelay (const uint8_t sd=0x0)

  Programmable delay of serial input, in time unit ∼ 1 ns.
- void SetStrobeSelect (const SerialStrobeType ss=SS_NoStrobe)
- void SetReadoutSpeedSelect (const ReadoutSpeed rss=RO_Fixed)

  Selection of serial read-out speed.
- void SetTokenDelay (const uint8_t td=0x0)

  Programmable delay of token input, in time unit ∼ 1 ns.
- void SetEnableLocalTrailer (const bool elt=true)

Enable of local trailers in read-out.

- void SetEnableLocalHeader (const bool elh=true)

  Enable of local headers in read-out.
- void SetEnableGlobalTrailer (const bool egt=true)

  Enable of global trailers in read-out (only valid for master TDC)
- void SetEnableGlobalHeader (const bool egh=true)

  Enable of global headers in read-out (only valid for master TDC)
- void SetKeepToken (const bool kt=true)
- void SetMaster (const bool m=true)
- void SetEnableBytewise (const bool seb=true)
- void SetBypassInputs (const bool sbi=true)

  Select serial in and token in from bypass inputs.
- void SetEnableOverflowDetect (const bool eod=true)

  Enable overflow detection of L1 buffers (should always be enabled!)
- void SetEnableRelative (const bool er=true)
- void SetEnableAutomaticReject (const bool ear=true)

  Enable of automatic rejection (should always be enabled if trigger matching mode!)
- void SetEnableSetCountersOnBunchReset (const bool escobr=true)

  Enable all counters to be set on bunch count reset.
- void SetEnableMasterResetCode (const bool emrc=true)

  Enable master reset code on encoded_control.
- void SetEnableMasterResetOnEventReset (const bool emroer=true)

  Enable master reset of whole TDC on event reset.
- void SetEnableResetChannelBufferWhenSeparator (const bool ercbws=true)

  Enable reset channel buffers when separator.
- void SetEnableSeparatorOnEventReset (const bool esoer=true)

  Enable generation of separator on event reset.
- void SetEnableSeparatorOnBunchReset (const bool esobr=true)

  Enable generation of separator on bunch reset.
- void SetEnableDirectEventReset (const bool eder=true)

  Enable of direct event reset input pin (1), otherwise taken from encoded control.
- void SetEnableDirectBunchReset (const bool edbr=true)

  Enable of direct bunch reset input pin (1), otherwise taken from encoded control.
- void SetEnableDirectTrigger (const bool edt=true)

  Enable of direct trigger input pin.
- void SetLowPowerMode (const bool lpm=true)

  Low power mode of channel buffers.
- void SetDLLControl (const uint8_t dc)

  Control of DLL (DLL charge pump levels)
- void SetModeRCCompression (const bool mrc=true)

  Perform RC interpolation on-chip (only valid in very high resolution mode)
- void SetModeRC (const bool mr=true)

  Enable of RR delay lines mode (in very high resolution mode) ; only for channels 0-4-8-12-16-20-24-28 active.
- void SetDLLMode (const DLLSpeedMode dsm)

  Selection of DLL speed mode.
- void SetPLLControl (const uint8_t charge_pump_current=0x4, const bool power_down_mode=false, const bool enable_test_outputs=false, const bool invert_connection_to_status=false)

  Control of PLL.
- void SetSerialClockDelay (const bool delay_clock, const uint8_t delay)

  Delay of internal serial clock.
- void SetIOClockDelay (const bool delay_clock, const uint8_t delay)

Delay of internal I/O clock.
- void SetCoreClockDelay (const bool delay_clock, const uint8_t delay)

  Delay of internal core clock.
- void SetDLLClockDelay (const bool delay_clock, const uint8_t delay)

  Delay of internal DLL clock.
- void SetSerialClockSource (const SerialClockSource scs)

  Selection of source for serial clock.
- void SetIOClockSource (const IOClockSource ics)

  Selection of clock source for I/O signals.
- void SetCoreClockSource (const CoreClockSource ccs)

  Selection of clock source for internal logic.
- void SetDLLClockSource (const DLLClockSource dcs)

  Selection of clock source for DLL.
- void SetRollOver (const uint16_t ro=0xFFF)

  Counter roll over value, defining maximal count value from where counters will be reset to 0.
- void SetEnableTTLSerial (const bool ts=true)

  Enable LV TTL inputs on serial registers, and disable their drivers.
- void SetEnableTTLControl (const bool tc=true)

  Enable LV TTL inputs on control registers.
- void SetEnableTTLReset (const bool tr=true)

  Enable LV TTL input on reset, otherwise uses LVDS input levels.
- void SetEnableTTLClock (const bool tc=true)

  Enable LV TTL inputs on: clk, aux_clock, otherwise uses LVDS input levels.
- void SetEnableTTLHit (const bool th=true)

  Enable LV TTL input on hit[31:0], otherwise uses LVDS input levels.

Static Private Attributes

- static const bit kTestSelect = 0
- static const bit kEnableErrorMark = 4
- static const bit kEnableErrorBypass = 5
- static const bit kEnableError = 6
- static const bit kReadoutSingleCycleSpeed = 17
- static const bit kSerialDelay = 20
- static const bit kStrobeSelect = 24
- static const bit kReadoutSpeedSelect = 26
- static const bit kTokenDelay = 27
- static const bit kEnableLocalTrailer = 31
- static const bit kEnableLocalHeader = 32
- static const bit kEnableGlobalTrailer = 33
- static const bit kEnableGlobalHeader = 34
- static const bit kKeepToken = 35
- static const bit kMaster = 36
- static const bit kEnableBytewise = 37
- static const bit kEnableSerial = 38
- static const bit kEnableJTAGReadout = 39
- static const bit kTDCId = 40
- static const bit kSelectBypassInputs = 44
- static const bit kReadoutFIFOSize = 45
- static const bit kRejectCountOffset = 48
- static const bit kSearchWindow = 60
- static const bit kMatchWindow = 72

- static const bit kLeadingResolution = 84
- static const bit kMaxEventSize = 116
- static const bit kRejectFIFOFull = 120
- static const bit kEnableReadoutOccupancy = 121
- static const bit kEnableReadoutSeparator = 122
- static const bit kEnableOverflowDetect = 123
- static const bit kEnableRelative = 124
- static const bit kEnableAutomaticReject = 125
- static const bit kEventCountOffset = 126
- static const bit kTriggerCountOffset = 138
- static const bit kEnableSetCountersOnBunchReset = 150
- static const bit kEnableMasterResetCode = 151
- static const bit kEnableMasterResetOnEventReset = 152
- static const bit kEnableResetChannelBufferWhenSeparator = 153
- static const bit kEnableSeparatorOnEventReset = 154
- static const bit kEnableSeparatorOnBunchReset = 155
- static const bit kEnableDirectEventReset = 156
- static const bit kEnableDirectBunchReset = 157
- static const bit kEnableDirectTrigger = 158
- static const bit kOffset0 = 438
- static const bit kCoarseCountOffset = 447
- static const bit kDLLTapAdjust0 = 459
- static const bit kRCAdjust0 = 555
- static const bit kLowPowerMode = 570
- static const bit kWidthSelect = 571
- static const bit kVernierOffset = 575
- static const bit kDLLControl = 580
- static const bit kDeadTime = 584
- static const bit kTestInvert = 586
- static const bit kTestMode = 587
- static const bit kTrailing = 588
- static const bit kLeading = 589
- static const bit kModeRCCompression = 590
- static const bit kModeRC = 591
- static const bit kDLLMode = 592
- static const bit kPLLControl = 594
- static const bit kSerialClockDelay = 602
- static const bit kIOClockDelay = 606
- static const bit kCoreClockDelay = 610
- static const bit kDLLClockDelay = 614
- static const bit kSerialClockSource = 618
- static const bit kIOClockSource = 620
- static const bit kCoreClockSource = 622
- static const bit kDLLClockSource = 624
- static const bit kRollOver = 627
- static const bit kEnableMatching = 639
- static const bit kEnablePair = 640
- static const bit kEnableTTLSerial = 641
- static const bit kEnableTTLControl = 642
- static const bit kEnableTTLReset = 643
- static const bit kEnableTTLClock = 644
- static const bit kEnableTTLHit = 645
- static const bit kSetupParity = 646

Additional Inherited Members

5.15.1 Detailed Description

Setup word to be sent to the HPTDC chip.

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

Author

Laurent Forthomme `laurent.forthomme@cern.ch`

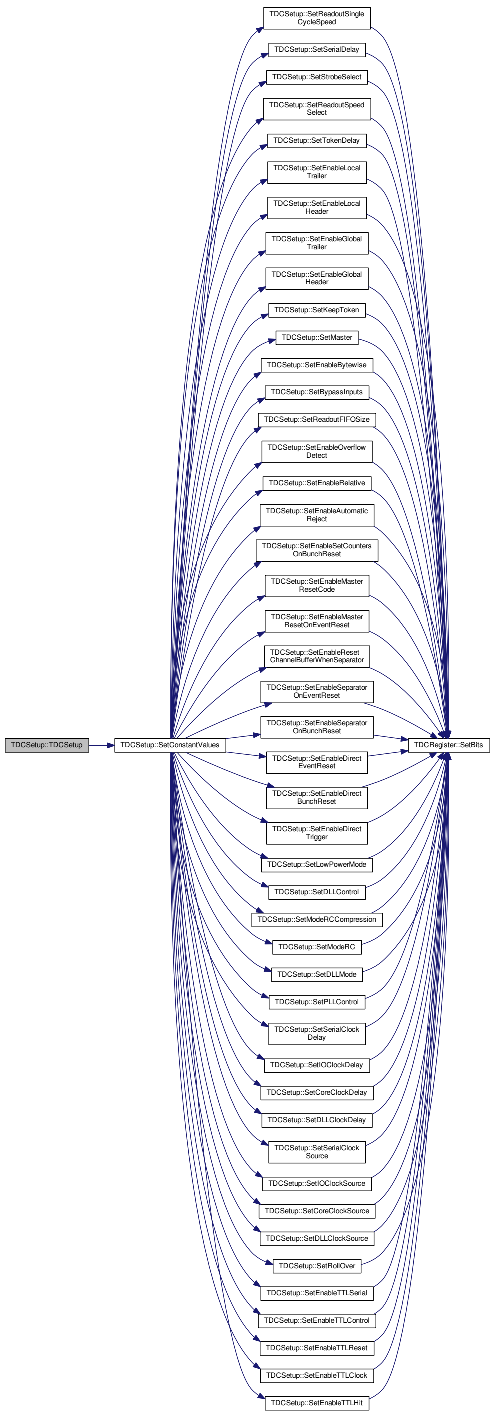
Date

16 Apr 2015

5.15.2 Constructor & Destructor Documentation

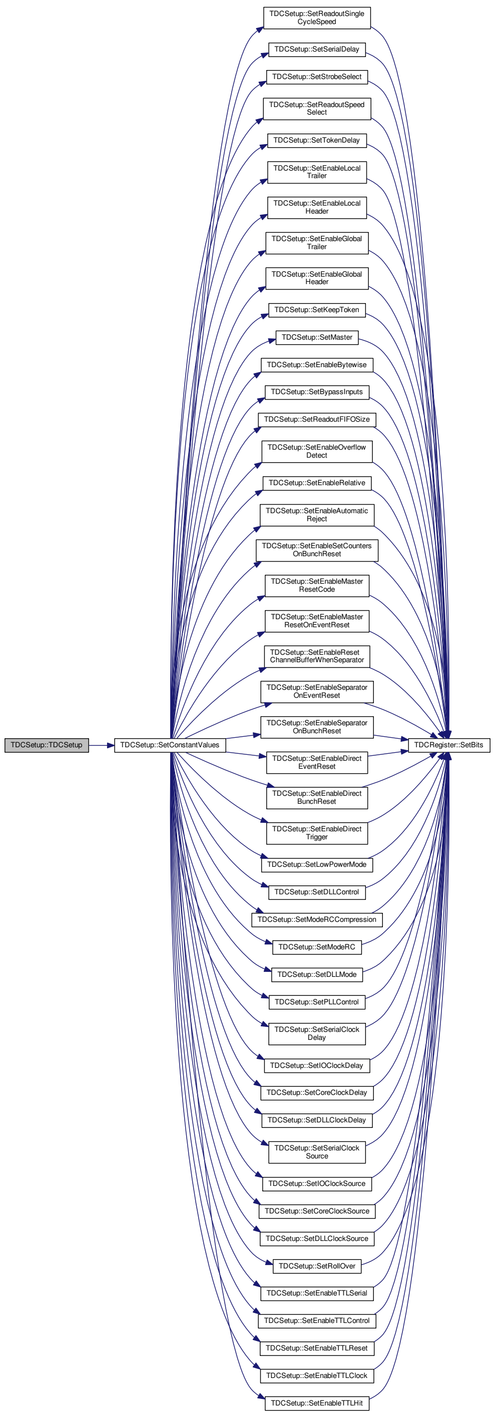
5.15.2.1 TDCSetup::TDCSetup ( ) [inline]

Here is the call graph for this function:


TDCSetup::TDCSetup
TDCSetup::SetConstantValues
TDCSetup::SetReadoutSingleCycleSpeed
TDCSetup::SetSerialDelay
TDCSetup::SetStrobeSelect
TDCSetup::SetReadoutSpeedSelect
TDCSetup::SetTokenDelay
TDCSetup::SetEnableLocalTrailer
TDCSetup::SetEnableLocalHeader
TDCSetup::SetEnableGlobalTrailer
TDCSetup::SetEnableGlobalHeader
TDCSetup::SetKeepToken
TDCSetup::SetMaster
TDCSetup::SetEnableBytewise
TDCSetup::SetBypassInputs
TDCSetup::SetReadoutFIFOSize
TDCSetup::SetEnableOverflowDetect
TDCSetup::SetEnableRelative
TDCSetup::SetEnableAutomaticReject
TDCSetup::SetEnableSetCountersOnBunchReset
TDCSetup::SetEnableMasterResetCode
TDCSetup::SetEnableMasterResetOnEventReset
TDCSetup::SetEnableResetChannelBufferWhenSeparator
TDCSetup::SetEnableSeparatorOnEventReset
TDCSetup::SetEnableSeparatorOnBunchReset
TDCSetup::SetEnableDirectEventReset
TDCSetup::SetEnableDirectBunchReset
TDCSetup::SetEnableDirectTrigger
TDCSetup::SetLowPowerMode
TDCSetup::SetDLLControl
TDCSetup::SetModeRCCompression
TDCSetup::SetModeRC
TDCSetup::SetDLLMode
TDCSetup::SetPLLControl
TDCSetup::SetSerialClockDelay
TDCSetup::SetIOClockDelay
TDCSetup::SetCoreClockDelay
TDCSetup::SetDLLClockDelay
TDCSetup::SetSerialClockSource
TDCSetup::SetIOClockSource
TDCSetup::SetCoreClockSource
TDCSetup::SetDLLClockSource
TDCSetup::SetRollOver
TDCSetup::SetEnableTTLSerial
TDCSetup::SetEnableTTLControl
TDCSetup::SetEnableTTLReset
TDCSetup::SetEnableTTLClock
TDCSetup::SetEnableTTLHit
TDCRegister::SetBits

5.15.2.2 TDCSetup::TDCSetup (const **TDCSetup** & *c*) [inline]

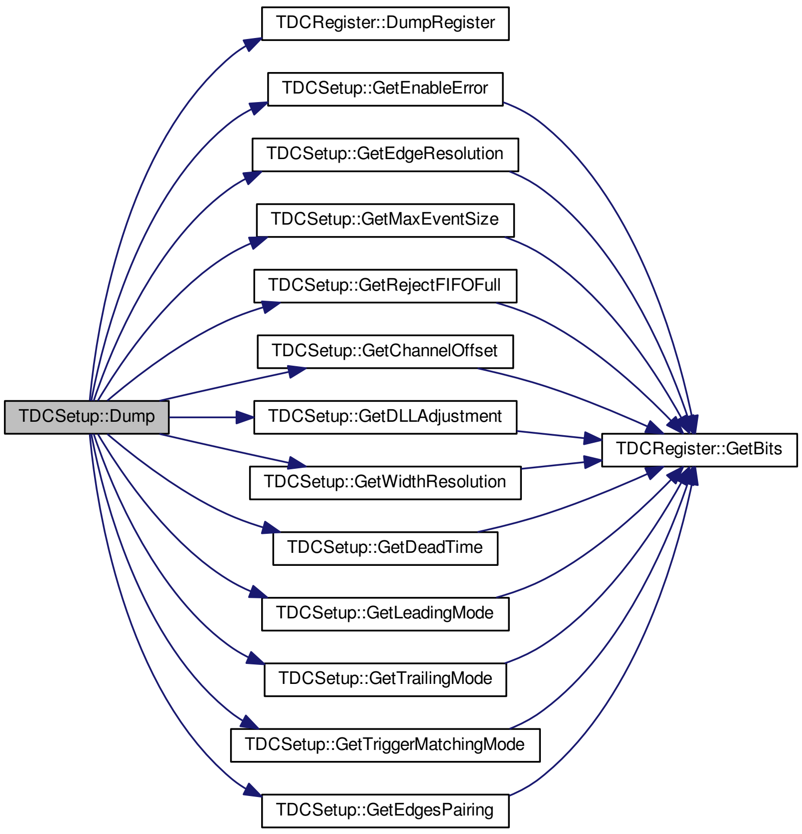
Here is the call graph for this function:


TDCSetup::TDCSetup
TDCSetup::SetConstantValues
TDCRegister::SetBits
TDCSetup::SetReadoutSingleCycleSpeed
TDCSetup::SetSerialDelay
TDCSetup::SetStrobeSelect
TDCSetup::SetReadoutSpeedSelect
TDCSetup::SetTokenDelay
TDCSetup::SetEnableLocalTrailer
TDCSetup::SetEnableLocalHeader
TDCSetup::SetEnableGlobalTrailer
TDCSetup::SetEnableGlobalHeader
TDCSetup::SetKeepToken
TDCSetup::SetMaster
TDCSetup::SetEnableBytewise
TDCSetup::SetBypassInputs
TDCSetup::SetReadoutFIFOSize
TDCSetup::SetEnableOverflowDetect
TDCSetup::SetEnableRelative
TDCSetup::SetEnableAutomaticReject
TDCSetup::SetEnableSetCountersOnBunchReset
TDCSetup::SetEnableMasterResetCode
TDCSetup::SetEnableMasterResetOnEventReset
TDCSetup::SetEnableResetChannelBufferWhenSeparator
TDCSetup::SetEnableSeparatorOnEventReset
TDCSetup::SetEnableSeparatorOnBunchReset
TDCSetup::SetEnableDirectEventReset
TDCSetup::SetEnableDirectBunchReset
TDCSetup::SetEnableDirectTrigger
TDCSetup::SetLowPowerMode
TDCSetup::SetDLLControl
TDCSetup::SetModeRCCompression
TDCSetup::SetModeRC
TDCSetup::SetDLLMode
TDCSetup::SetPLLControl
TDCSetup::SetSerialClockDelay
TDCSetup::SetIOClockDelay
TDCSetup::SetCoreClockDelay
TDCSetup::SetDLLClockDelay
TDCSetup::SetSerialClockSource
TDCSetup::SetIOClockSource
TDCSetup::SetCoreClockSource
TDCSetup::SetDLLClockSource
TDCSetup::SetRollOver
TDCSetup::SetEnableTTLSerial
TDCSetup::SetEnableTTLControl
TDCSetup::SetEnableTTLReset
TDCSetup::SetEnableTTLClock
TDCSetup::SetEnableTTLHit

5.15.3 Member Function Documentation

5.15.3.1 void TDCSetup::Dump (int *verb* = `1`, std::ostream & *os* = `std::cout`) const

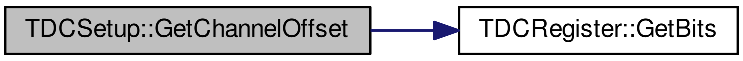
Here is the call graph for this function:


TDCSetup::Dump
TDCRegister::DumpRegister
TDCSetup::GetEnableError
TDCSetup::GetEdgeResolution
TDCSetup::GetMaxEventSize
TDCSetup::GetRejectFIFOFull
TDCSetup::GetChannelOffset
TDCSetup::GetDLLAdjustment
TDCSetup::GetWidthResolution
TDCSetup::GetDeadTime
TDCSetup::GetLeadingMode
TDCSetup::GetTrailingMode
TDCSetup::GetTriggerMatchingMode
TDCSetup::GetEdgesPairing
TDCRegister::GetBits

5.15.3.2 uint16_t TDCSetup::GetChannelOffset (int *channel*) const `[inline]`

Return the offset for one single channel.

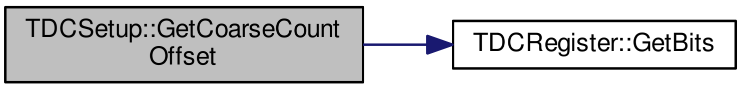
Here is the call graph for this function:



5.15.3.3 uint16_t TDCSetup::GetCoarseCountOffset ( ) const `[inline]`

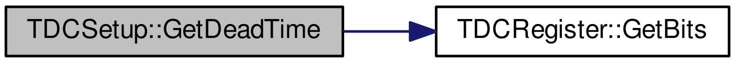
Extract offset for the coarse time counter.

Here is the call graph for this function:



5.15.3.4 DeadTime TDCSetup::GetDeadTime ( ) const [inline]

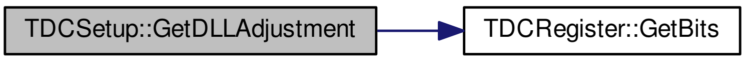
Here is the call graph for this function:



5.15.3.5 uint8_t TDCSetup::GetDLLAdjustment (int *tap*) const [inline]

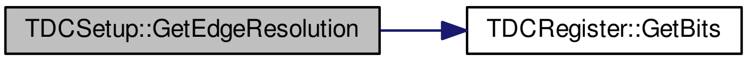
Set the adjustment of DLL taps.

Here is the call graph for this function:



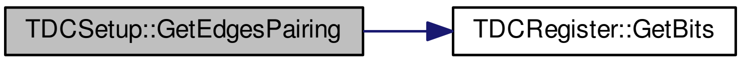
5.15.3.6 EdgeResolution TDCSetup::GetEdgeResolution ( ) const [inline]

Here is the call graph for this function:



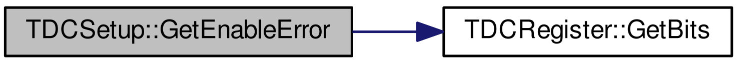
5.15.3.7 bool TDCSetup::GetEdgesPairing ( ) const [inline]

Here is the call graph for this function:



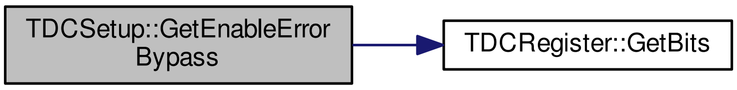
5.15.3.8 uint16_t TDCSetup::GetEnableError ( ) const [inline]

Here is the call graph for this function:



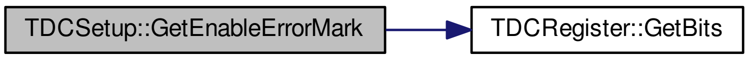
5.15.3.9 bool TDCSetup::GetEnableErrorBypass ( ) const [inline]

Here is the call graph for this function:



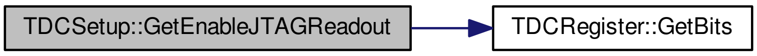
5.15.3.10 bool TDCSetup::GetEnableErrorMark ( ) const [inline]

Here is the call graph for this function:



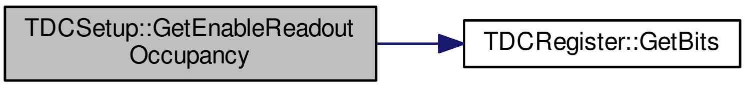
5.15.3.11 bool TDCSetup::GetEnableJTAGReadout ( ) const [inline]

Here is the call graph for this function:



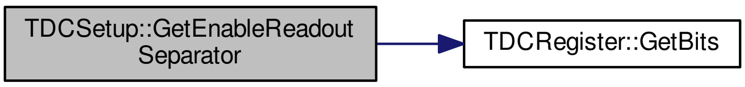
5.15.3.12 bool TDCSetup::GetEnableReadoutOccupancy ( ) const [inline]

Here is the call graph for this function:



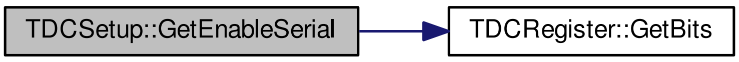
5.15.3.13 bool TDCSetup::GetEnableReadoutSeparator ( ) const [inline]

Here is the call graph for this function:



5.15.3.14 bool TDCSetup::GetEnableSerial ( ) const [inline]

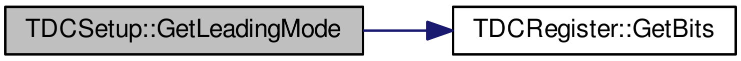
Here is the call graph for this function:



5.15.3.15 bool TDCSetup::GetLeadingMode ( ) const [inline]

Extract the status for the detection of leading edges.

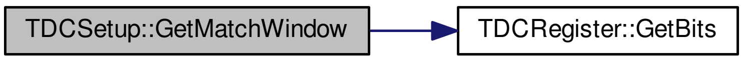
Here is the call graph for this function:



5.15.3.16 uint16_t TDCSetup::GetMatchWindow ( ) const `[inline]`

Extract the matching window (in multiples of clock cycles: 0=25 ns, 1=50 ns, ...)

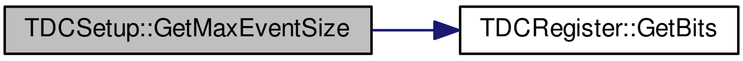
Here is the call graph for this function:



5.15.3.17 uint8_t TDCSetup::GetMaxEventSize ( ) const `[inline]`

Extract the maximum number of hits per event.

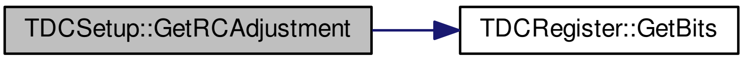
Here is the call graph for this function:



5.15.3.18 uint8_t TDCSetup::GetRCAdjustment (int *tap*) `[inline]`

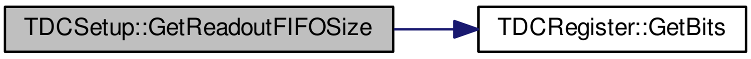
Extract the adjustment of the RC delay line.

Here is the call graph for this function:



5.15.3.19 int TDCSetup::GetReadoutFIFOSize ( ) const [inline]

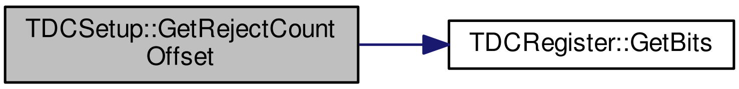
Here is the call graph for this function:



5.15.3.20 uint16_t TDCSetup::GetRejectCountOffset ( ) const [inline]

Extract the offset in reject counter.

Here is the call graph for this function:

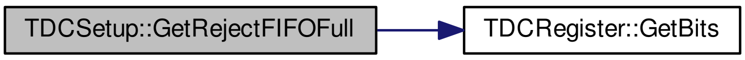


5.15.3.21 bool TDCSetup::GetRejectFIFOFull ( ) const [inline]

Are hits rejected when readout FIFO is full?

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

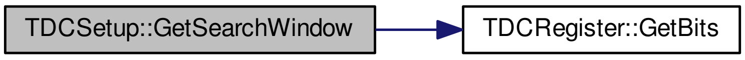
Here is the call graph for this function:



5.15.3.22 uint16_t TDCSetup::GetSearchWindow ( ) const [inline]

Extract the search window (in multiples of clock cycles: 0=25 ns, 1=50 ns, ...)

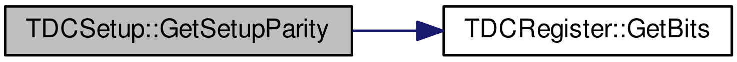
Here is the call graph for this function:



5.15.3.23 bool TDCSetup::GetSetupParity ( ) const [inline]

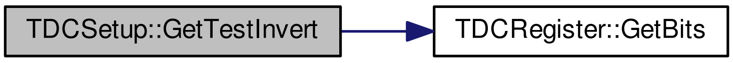
Extract the parity of setup data (should be an even parity)

Here is the call graph for this function:



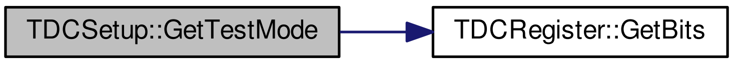
5.15.3.24 bool TDCSetup::GetTestInvert ( ) const [inline]

Here is the call graph for this function:



5.15.3.25 bool TDCSetup::GetTestMode ( ) const [inline]

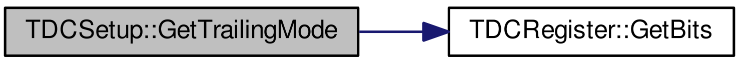
Here is the call graph for this function:



5.15.3.26 bool TDCSetup::GetTrailingMode ( ) const [inline]

Extract the status for the detection of trailing edges.

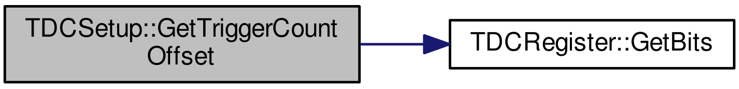
Here is the call graph for this function:



5.15.3.27 uint16_t TDCSetup::GetTriggerCountOffset ( ) const [inline]

Extract trigger time tag count offset.

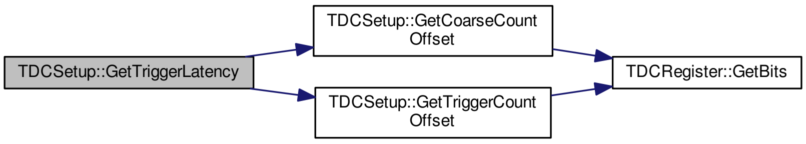
Here is the call graph for this function:



5.15.3.28 uint16_t TDCSetup::GetTriggerLatency ( ) const [inline]

Effective trigger latency in number of clock cycles (when no counter roll-over is used)

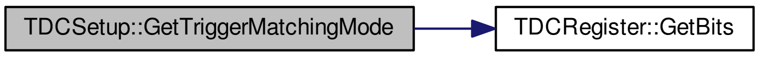
Here is the call graph for this function:


TDCSetup::GetTriggerLatency
TDCSetup::GetCoarseCount Offset
TDCSetup::GetTriggerCount Offset
TDCRegister::GetBits

5.15.3.29 bool TDCSetup::GetTriggerMatchingMode ( ) const [inline]

Extract the enable status of trigger matching mode.

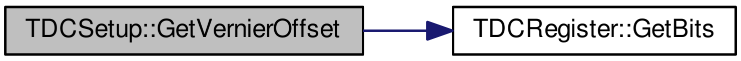
Here is the call graph for this function:



5.15.3.30 uint8_t TDCSetup::GetVernierOffset ( ) const [inline]

Extract the offset in vernier decoding.

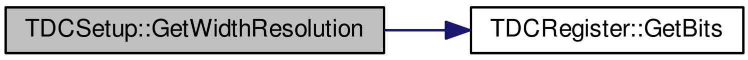
Here is the call graph for this function:



5.15.3.31 WidthResolution TDCSetup::GetWidthResolution ( ) const [inline]

Extract the pulse width resolution when paired measurements are performed.

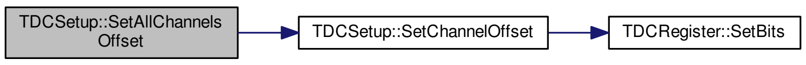
Here is the call graph for this function:



5.15.3.32 void TDCSetup::SetAllChannelsOffset (uint16_t *offset*) [inline]

Set the time offset for all channels.

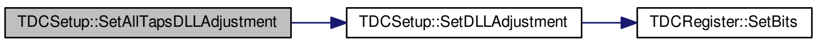
Here is the call graph for this function:



5.15.3.33 void TDCSetup::SetAllTapsDLLAdjustment (uint8_t *adj*) [inline]

Extract the adjustment of DLL taps.

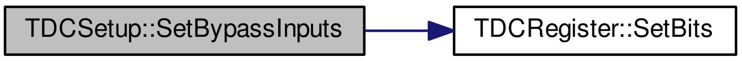
Here is the call graph for this function:



5.15.3.34 void TDCSetup::SetBypassInputs (const bool *sbi* = `true`) `[inline]`, `[private]`

Select serial in and token in from bypass inputs.

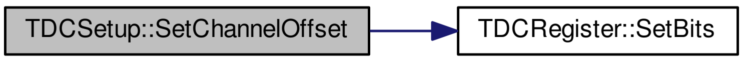
Here is the call graph for this function:



5.15.3.35 void TDCSetup::SetChannelOffset (int *channel*, uint16_t *offset*) `[inline]`

Set the time offset for one single channel.

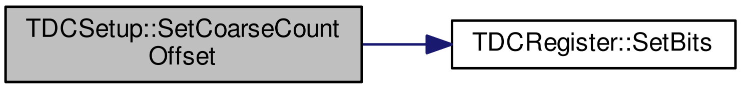
Here is the call graph for this function:



5.15.3.36 void TDCSetup::SetCoarseCountOffset (uint16_t *cco*) `[inline]`

Set offset for the coarse time counter.

Here is the call graph for this function:

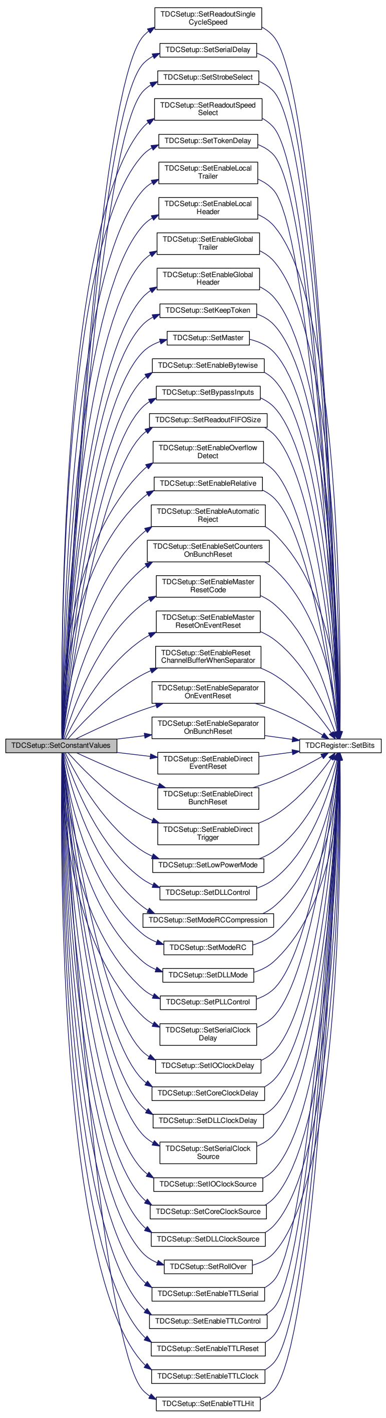


5.15.3.37 void TDCSetup::SetConstantValues ( ) `[virtual]`

Ensure that the critical constant values are properly set in the setup word.

Implements TDCRegister.

Here is the call graph for this function:


TDCSetup::SetConstantValues
TDCSetup::SetReadoutSingleCycleSpeed
TDCSetup::SetSerialDelay
TDCSetup::SetStrobeSelect
TDCSetup::SetReadoutSpeedSelect
TDCSetup::SetTokenDelay
TDCSetup::SetEnableLocalTrailer
TDCSetup::SetEnableLocalHeader
TDCSetup::SetEnableGlobalTrailer
TDCSetup::SetEnableGlobalHeader
TDCSetup::SetKeepToken
TDCSetup::SetMaster
TDCSetup::SetEnableBytewise
TDCSetup::SetBypassInputs
TDCSetup::SetReadoutFIFOSize
TDCSetup::SetEnableOverflowDetect
TDCSetup::SetEnableRelative
TDCSetup::SetEnableAutomaticReject
TDCSetup::SetEnableSetCountersOnBunchReset
TDCSetup::SetEnableMasterResetCode
TDCSetup::SetEnableMasterResetOnEventReset
TDCSetup::SetEnableResetChannelBufferWhenSeparator
TDCSetup::SetEnableSeparatorOnEventReset
TDCSetup::SetEnableSeparatorOnBunchReset
TDCSetup::SetEnableDirectEventReset
TDCSetup::SetEnableDirectBunchReset
TDCSetup::SetEnableDirectTrigger
TDCSetup::SetLowPowerMode
TDCSetup::SetDLLControl
TDCSetup::SetModeRCCompression
TDCSetup::SetModeRC
TDCSetup::SetDLLMode
TDCSetup::SetPLLControl
TDCSetup::SetSerialClockDelay
TDCSetup::SetIOClockDelay
TDCSetup::SetCoreClockDelay
TDCSetup::SetDLLClockDelay
TDCSetup::SetSerialClockSource
TDCSetup::SetIOClockSource
TDCSetup::SetCoreClockSource
TDCSetup::SetDLLClockSource
TDCSetup::SetRollOver
TDCSetup::SetEnableTTLSerial
TDCSetup::SetEnableTTLControl
TDCSetup::SetEnableTTLReset
TDCSetup::SetEnableTTLClock
TDCSetup::SetEnableTTLHit
TDCRegister::SetBits

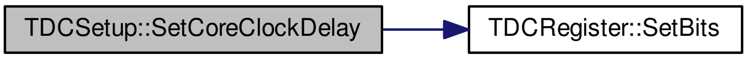
5.15.3.38 void TDCSetup::SetCoreClockDelay (const bool *delay_clock,* const uint8_t *delay*) `[inline]`, `[private]`

Delay of internal core clock.

Parameters

in	*delay_clock*	Use of direct clock (0) or delayed clock (1)
in	*delay*	Delay in steps of (typically) 0.13 ns

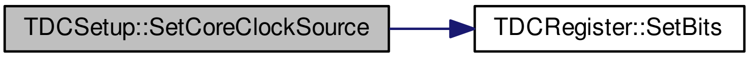
Here is the call graph for this function:



5.15.3.39 void TDCSetup::SetCoreClockSource (const CoreClockSource *ccs*) `[inline]`, `[private]`

Selection of clock source for internal logic.

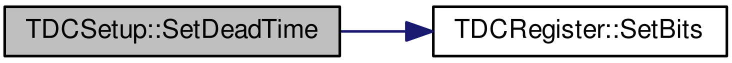
Here is the call graph for this function:



5.15.3.40 void TDCSetup::SetDeadTime (const DeadTime *dt*) `[inline]`

Channel dead time between hits.

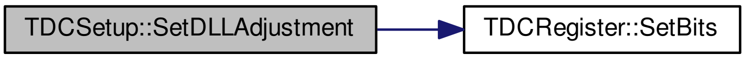
Here is the call graph for this function:



5.15.3.41 void TDCSetup::SetDLLAdjustment (int *tap*, uint8_t *adj*) `[inline]`

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

Here is the call graph for this function:



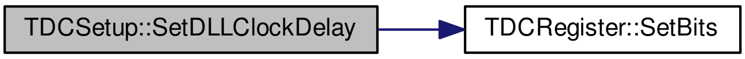
5.15.3.42 void TDCSetup::SetDLLClockDelay (const bool *delay_clock*, const uint8_t *delay*) [inline], [private]

Delay of internal DLL clock.

Parameters

in	*delay_clock*	Use of direct clock (0) or delayed clock (1)
in	*delay*	Delay in steps of (typically) 0.13 ns

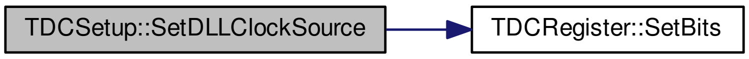
Here is the call graph for this function:



5.15.3.43 void TDCSetup::SetDLLClockSource (const DLLClockSource *dcs*) [inline], [private]

Selection of clock source for DLL.

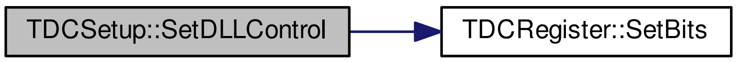
Here is the call graph for this function:



5.15.3.44 void TDCSetup::SetDLLControl (const uint8_t *dc*) [inline], [private]

Control of DLL (DLL charge pump levels)

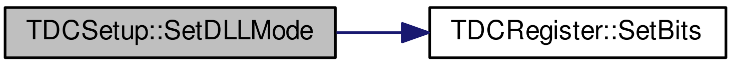
Here is the call graph for this function:



5.15.3.45 void TDCSetup::SetDLLMode (const **DLLSpeedMode** *dsm*) `[inline], [private]`

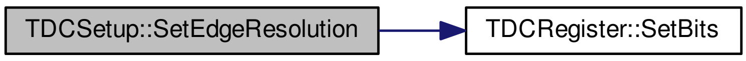
Selection of DLL speed mode.

Here is the call graph for this function:



5.15.3.46 void TDCSetup::SetEdgeResolution (const **EdgeResolution** *r*) `[inline]`

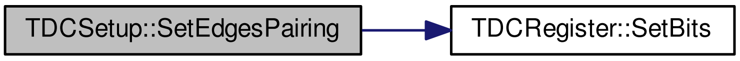
Here is the call graph for this function:



5.15.3.47 void TDCSetup::SetEdgesPairing (const bool *pair* = `true`) `[inline]`

Enable the pairing of leading and trailing edges (overrides individual enable of leading/trailing edges)

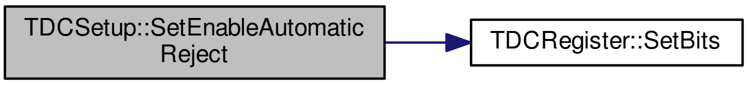
Here is the call graph for this function:



5.15.3.48 void TDCSetup::SetEnableAutomaticReject (const bool *ear* = `true`) `[inline]`, `[private]`

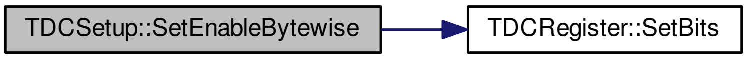
Enable of automatic rejection (should always be enabled if trigger matching mode!)

Here is the call graph for this function:



5.15.3.49 void TDCSetup::SetEnableBytewise (const bool *seb* = `true`) `[inline]`, `[private]`

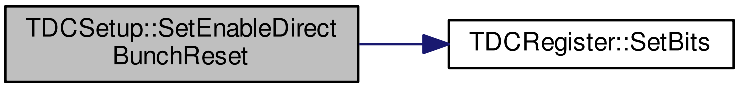
Here is the call graph for this function:



5.15.3.50 void TDCSetup::SetEnableDirectBunchReset (const bool *edbr* = `true`) `[inline]`, `[private]`

Enable of direct bunch reset input pin (1), otherwise taken from encoded control.

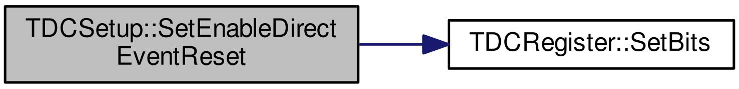
Here is the call graph for this function:



5.15.3.51 void TDCSetup::SetEnableDirectEventReset (const bool *eder* = `true`) `[inline]`, `[private]`

Enable of direct event reset input pin (1), otherwise taken from encoded control.

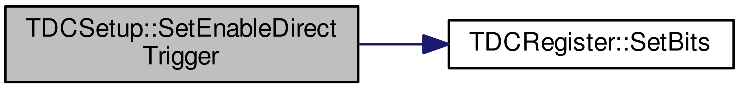
Here is the call graph for this function:



5.15.3.52 void TDCSetup::SetEnableDirectTrigger (const bool *edt* = `true`) `[inline]`, `[private]`

Enable of direct trigger input pin.

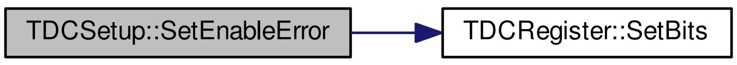
Here is the call graph for this function:



5.15.3.53 void TDCSetup::SetEnableError (const uint16_t & *err*) `[inline]`

Enable internal error types for generation of global error signals.

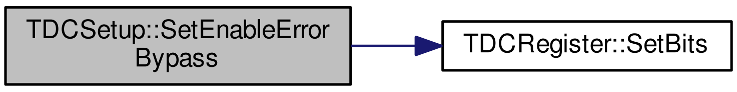
Here is the call graph for this function:



5.15.3.54 void TDCSetup::SetEnableErrorBypass (const bool *eb*) [inline]

Bypass TDC chip if global error signal is set.

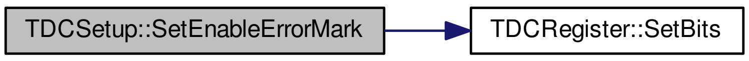
Here is the call graph for this function:



5.15.3.55 void TDCSetup::SetEnableErrorMark (const bool *em*) [inline]

Mark events with error if global error signal is set.

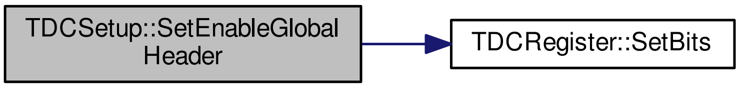
Here is the call graph for this function:



5.15.3.56 void TDCSetup::SetEnableGlobalHeader (const bool *egh* = true) [inline], [private]

Enable of global headers in read-out (only valid for master TDC)

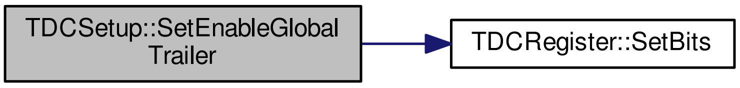
Here is the call graph for this function:



5.15.3.57 void TDCSetup::SetEnableGlobalTrailer (const bool *egt* = `true`) `[inline]`, `[private]`

Enable of global trailers in read-out (only valid for master TDC)

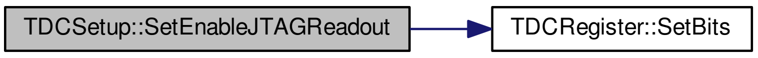
Here is the call graph for this function:



5.15.3.58 void TDCSetup::SetEnableJTAGReadout (const bool *jr*) `[inline]`

Enable of read-out via JTAG.

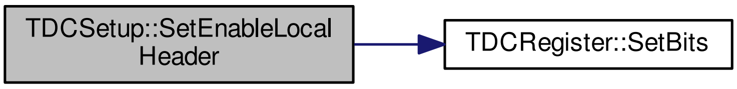
Here is the call graph for this function:



5.15.3.59 void TDCSetup::SetEnableLocalHeader (const bool *elh* = `true`) `[inline]`, `[private]`

Enable of local headers in read-out.

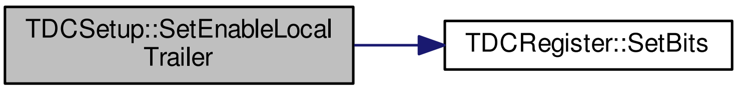
Here is the call graph for this function:



5.15.3.60 void TDCSetup::SetEnableLocalTrailer (const bool *elt* = `true`) `[inline]`, `[private]`

Enable of local trailers in read-out.

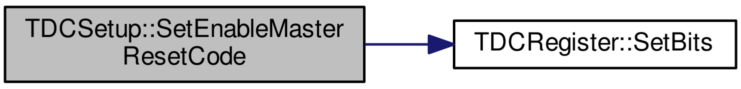
Here is the call graph for this function:



5.15.3.61 void TDCSetup::SetEnableMasterResetCode (const bool *emrc* = `true`) `[inline]`, `[private]`

Enable master reset code on encoded_control.

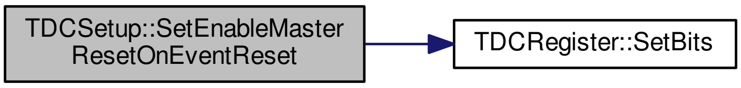
Here is the call graph for this function:



5.15.3.62 void TDCSetup::SetEnableMasterResetOnEventReset (const bool *emroer* = `true`) `[inline]`, `[private]`

Enable master reset of whole TDC on event reset.

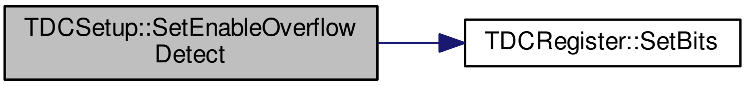
Here is the call graph for this function:



5.15.3.63 void TDCSetup::SetEnableOverflowDetect (const bool *eod* = `true`) `[inline]`, `[private]`

Enable overflow detection of L1 buffers (should always be enabled!)

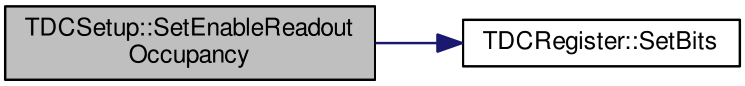
Here is the call graph for this function:



5.15.3.64 void TDCSetup::SetEnableReadoutOccupancy (const bool *ro* = `true`) `[inline]`

Enable the readout of buffer occupancies for each event (for debugging purposes)

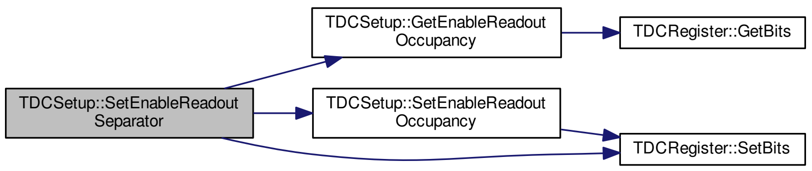
Here is the call graph for this function:



5.15.3.65 void TDCSetup::SetEnableReadoutSeparator (const bool *ro* = `true`) `[inline]`

Enable the readout of separators for each event (for debugging purposes, valid if readout of occupancies is enabled)

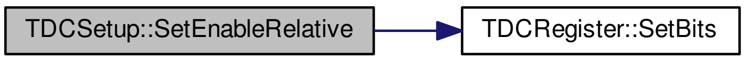
Here is the call graph for this function:


TDCSetup::SetEnableReadout Separator
TDCSetup::GetEnableReadout Occupancy
TDCSetup::SetEnableReadout Occupancy
TDCRegister::GetBits
TDCRegister::SetBits

5.15.3.66 void TDCSetup::SetEnableRelative (const bool *er* = `true`) `[inline]`, `[private]`

Enable read-out of relative time to trigger time tag. Only valid when using trigger matching mode.

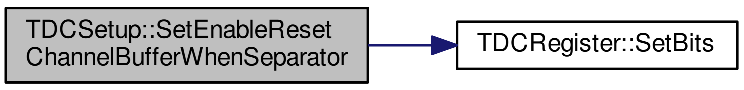
Here is the call graph for this function:



5.15.3.67 void TDCSetup::SetEnableResetChannelBufferWhenSeparator (const bool *ercbws* = `true`) `[inline]`, `[private]`

Enable reset channel buffers when separator.

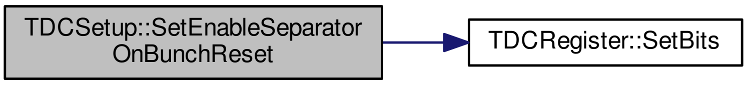
Here is the call graph for this function:



5.15.3.68 void TDCSetup::SetEnableSeparatorOnBunchReset (const bool *esobr* = `true`) `[inline]`, `[private]`

Enable generation of separator on bunch reset.

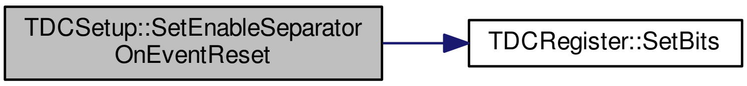
Here is the call graph for this function:



5.15.3.69 void TDCSetup::SetEnableSeparatorOnEventReset (const bool *esoer* = `true`) `[inline]`, `[private]`

Enable generation of separator on event reset.

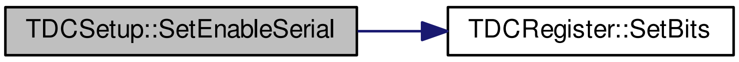
Here is the call graph for this function:



5.15.3.70 void TDCSetup::SetEnableSerial (const bool *es*) `[inline]`

Enable of serial read-out (otherwise parallel read-out)

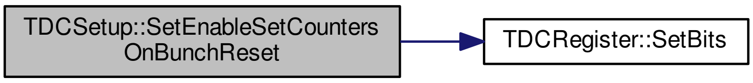
Here is the call graph for this function:



5.15.3.71 void TDCSetup::SetEnableSetCountersOnBunchReset (const bool *escobr* = `true`) `[inline]`, `[private]`

Enable all counters to be set on bunch count reset.

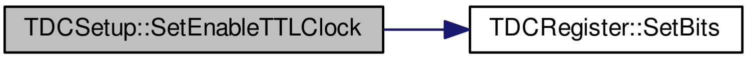
Here is the call graph for this function:



5.15.3.72 void TDCSetup::SetEnableTTLClock (const bool *tc* = `true`) `[inline]`, `[private]`

Enable LV TTL inputs on: clk, aux_clock, otherwise uses LVDS input levels.

Here is the call graph for this function:



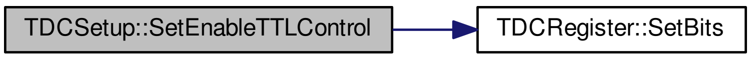
5.15.3.73 void TDCSetup::SetEnableTTLControl (const bool *tc* = `true`) `[inline]`, `[private]`

Enable LV TTL inputs on control registers.

Enable LV TTL input on:

- trigger,
- bunch_reset,
- event_reset,
- encoded_control, otherwise uses LVDS input levels.

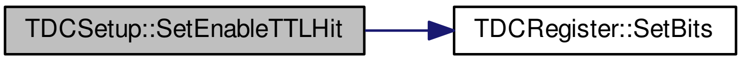
Here is the call graph for this function:



5.15.3.74 void TDCSetup::SetEnableTTLHit (const bool *th* = `true`) `[inline]`, `[private]`

Enable LV TTL input on hit[31:0], otherwise uses LVDS input levels.

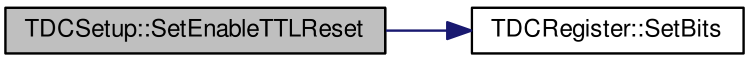
Here is the call graph for this function:



5.15.3.75 void TDCSetup::SetEnableTTLReset (const bool *tr* = `true`) `[inline]`, `[private]`

Enable LV TTL input on reset, otherwise uses LVDS input levels.

Here is the call graph for this function:



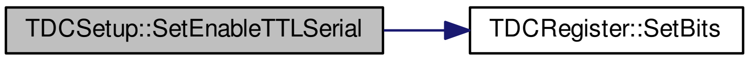
5.15.3.76 void TDCSetup::SetEnableTTLSerial (const bool *ts* = `true`) `[inline]`, `[private]`

Enable LV TTL inputs on serial registers, and disable their drivers.

Enable LV TTL input on:

- serial_in,
- serial_bypass_in,
- token_in,
- token_bypass_in, otherwise uses LVDS input levels. Disable LVDS drivers on:
- serial_out,
- strobe_out,
- token_out.

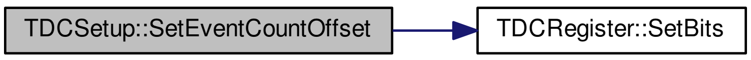
Here is the call graph for this function:



5.15.3.77 void TDCSetup::SetEventCountOffset (uint16_t *eco*) [inline]

Set offset for the event counter.

Here is the call graph for this function:



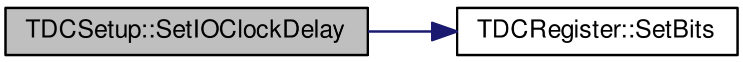
5.15.3.78 void TDCSetup::SetIOClockDelay (const bool *delay_clock,* const uint8_t *delay*) [inline], [private]

Delay of internal I/O clock.

Parameters

in	*delay_clock*	Use of direct clock (0) or delayed clock (1)
in	*delay*	Delay in steps of (typically) 0.13 ns

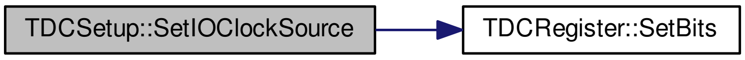
Here is the call graph for this function:



5.15.3.79 void TDCSetup::SetIOClockSource (const IOClockSource *ics*) [inline], [private]

Selection of clock source for I/O signals.

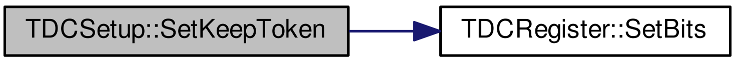
Here is the call graph for this function:



5.15.3.80 void TDCSetup::SetKeepToken (const bool *kt* = `true`) `[inline]`, `[private]`

Keep token until end of event or no more data, otherwise pass token after each word read. Must be enabled when using trigger matching.

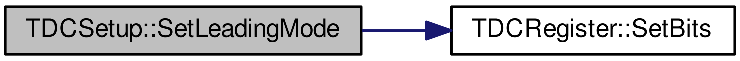
Here is the call graph for this function:



5.15.3.81 void TDCSetup::SetLeadingMode (const bool *lead* = `true`) `[inline]`

Enable the detection of leading edges.

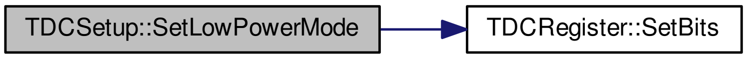
Here is the call graph for this function:



5.15.3.82 void TDCSetup::SetLowPowerMode (const bool *lpm* = `true`) `[inline]`, `[private]`

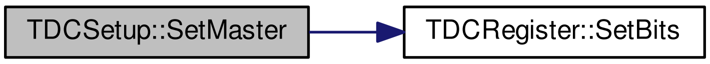
Low power mode of channel buffers.

Here is the call graph for this function:



5.15.3.83 void TDCSetup::SetMaster (const bool *m* = `true`) `[inline]`, `[private]`

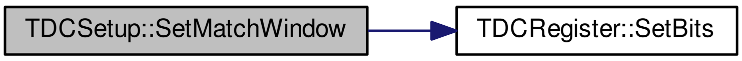
Here is the call graph for this function:



5.15.3.84 void TDCSetup::SetMatchWindow (uint16_t *mw*) `[inline]`

Set the matching window (in multiples of clock cycles: 0=25 ns, 1=50 ns, ...)

Here is the call graph for this function:

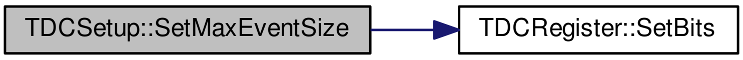


5.15.3.85 void TDCSetup::SetMaxEventSize (int *sz* = `-1`) `[inline]`

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 lower than 0 or bigger than 128 then set to unimited.

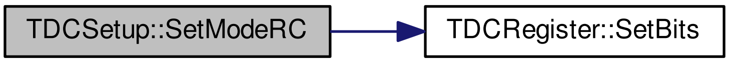
Here is the call graph for this function:



5.15.3.86 void TDCSetup::SetModeRC (const bool *mr* = `true`) `[inline]`, `[private]`

Enable of RR delay lines mode (in very high resolution mode) ; only for channels 0-4-8-12-16-20-24-28 active.

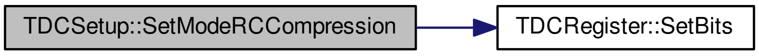
Here is the call graph for this function:



5.15.3.87 void TDCSetup::SetModeRCCompression (const bool *mrc* = `true`) `[inline]`, `[private]`

Perform RC interpolation on-chip (only valid in very high resolution mode)

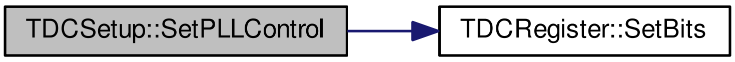
Here is the call graph for this function:



5.15.3.88 void TDCSetup::SetPLLControl (const uint8_t *charge_pump_current* = `0x4`, const bool *power_down_mode* = `false`, const bool *enable_test_outputs* = `false`, const bool *invert_connection_to_status* = `false`) `[inline]`, `[private]`

Control of PLL.

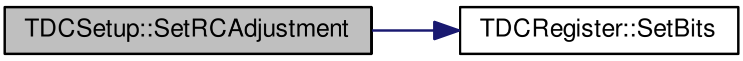
Here is the call graph for this function:



5.15.3.89 void TDCSetup::SetRCAdjustment (int *tap*, uint8_t *adj*) [inline]

Set the adjustment of the RC delay line.

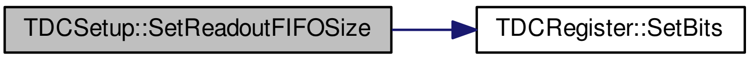
Here is the call graph for this function:



5.15.3.90 void TDCSetup::SetReadoutFIFOSize (int *rfs*) [inline]

Effective size of readout FIFO.

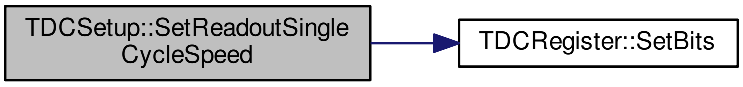
Here is the call graph for this function:



5.15.3.91 void TDCSetup::SetReadoutSingleCycleSpeed (const ReadoutSingleCycleSpeed *rscs* = RSC_40Mbits_s) [inline], [private]

Serial transmission speed in single cycle mode.

Here is the call graph for this function:



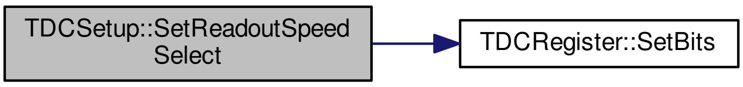
5.15.3.92 void TDCSetup::SetReadoutSpeedSelect (const ReadoutSpeed *rss* = RO_Fixed) [inline], [private]

Selection of serial read-out speed.

Parameters

in	*rss*	• 0: Selection of serial read-out speed (as defined by setup[19:17], *Set←ReadoutSingleCycleSpeed*) • 1: 80 Mbits/s (PLL lock required)

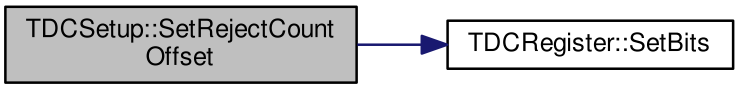
Here is the call graph for this function:



5.15.3.93 void TDCSetup::SetRejectCountOffset (uint16_t *rco*) [inline]

Set the offset in reject counter (defines reject latency together with coarse count offset)

Here is the call graph for this function:

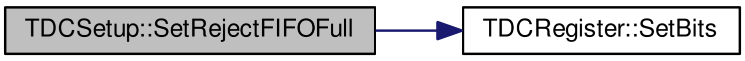


5.15.3.94 void TDCSetup::SetRejectFIFOFull (const bool *rej* = `true`) `[inline]`

Reject hits when readout FIFO full.

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

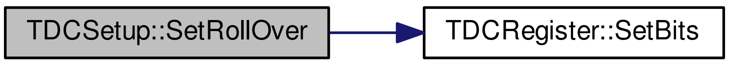
Here is the call graph for this function:



5.15.3.95 void TDCSetup::SetRollOver (const uint16_t *ro* = `0xFFF`) `[inline]`, `[private]`

Counter roll over value, defining maximal count value from where counters will be reset to 0.

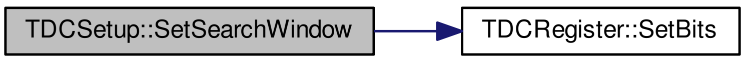
Here is the call graph for this function:



5.15.3.96 void TDCSetup::SetSearchWindow (uint16_t *sw*) `[inline]`

Set the search window (in multiples of clock cycles: 0=25 ns, 1=50 ns, ...)

Here is the call graph for this function:



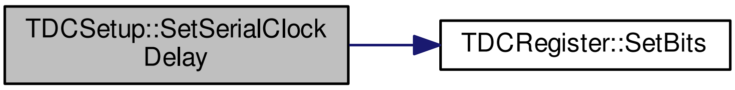
5.15.3.97 void TDCSetup::SetSerialClockDelay (const bool *delay_clock*, const uint8_t *delay*) `[inline]`, `[private]`

Delay of internal serial clock.

Parameters

in	*delay_clock*	Use of direct clock (0) or delayed clock (1)
in	*delay*	Delay in steps of (typically) 0.13 ns

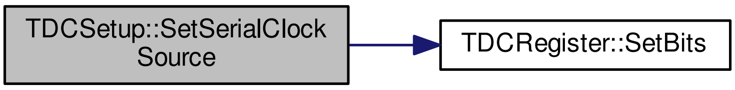
Here is the call graph for this function:



5.15.3.98 void TDCSetup::SetSerialClockSource (const **SerialClockSource** *scs*) `[inline]`, `[private]`

Selection of source for serial clock.

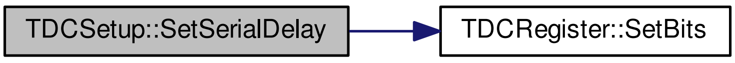
Here is the call graph for this function:



5.15.3.99 void TDCSetup::SetSerialDelay (const uint8_t *sd* = `0x0`) `[inline]`, `[private]`

Programmable delay of serial input, in time unit $\sim$ 1 ns.

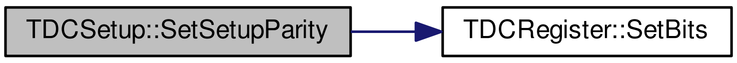
Here is the call graph for this function:



5.15.3.100 void TDCSetup::SetSetupParity (const bool *sp* = `true`) `[inline]`

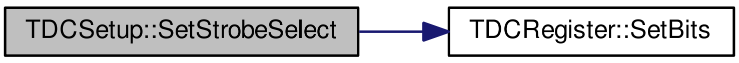
Set the parity of setup data (should be an even parity)

Here is the call graph for this function:



5.15.3.101 void TDCSetup::SetStrobeSelect (const SerialStrobeType *ss* = SS_NoStrobe) [inline], [private]

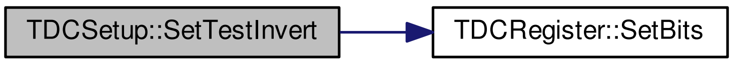
Here is the call graph for this function:



5.15.3.102 void TDCSetup::SetTestInvert (const bool *ti* = true) [inline]

Automatic inversion of test pattern. Only used during production testing.

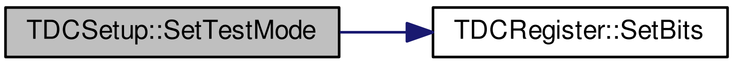
Here is the call graph for this function:



5.15.3.103 void TDCSetup::SetTestMode (const bool *tm* = true) [inline]

Test mode where hit data are taken from coretest. Only used during production testing.

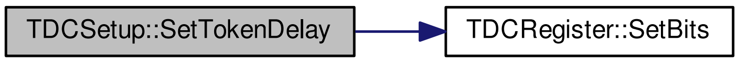
Here is the call graph for this function:



5.15.3.104 void TDCSetup::SetTokenDelay (const uint8_t *td* = `0x0`) `[inline]`, `[private]`

Programmable delay of token input, in time unit ∼ 1 ns.

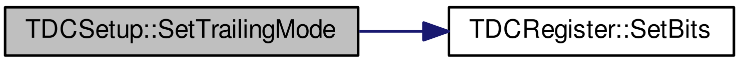
Here is the call graph for this function:



5.15.3.105 void TDCSetup::SetTrailingMode (const bool *trail* = `true`) `[inline]`

Enable/disable the detection of trailing edges.

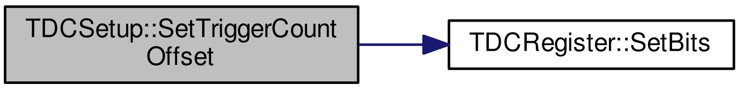
Here is the call graph for this function:



5.15.3.106 void TDCSetup::SetTriggerCountOffset (uint16_t *tco*) `[inline]`

Set offset for the trigger time tag counter to set effective trigger latency.

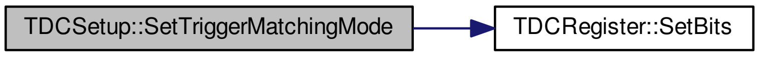
Here is the call graph for this function:



5.15.3.107 void TDCSetup::SetTriggerMatchingMode (const bool *trig* = `true`) `[inline]`

Set the enable status of trigger matching mode.

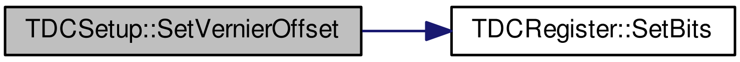
Here is the call graph for this function:



5.15.3.108 void TDCSetup::SetVernierOffset (const uint8_t *vo*) `[inline]`

Set the offset in vernier decoding.

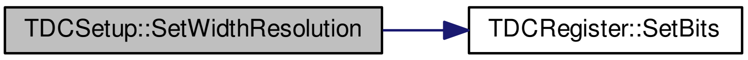
Here is the call graph for this function:



5.15.3.109 void TDCSetup::SetWidthResolution (const WidthResolution *r*) `[inline]`

Set the pulse width resolution when paired measurements are performed.

Here is the call graph for this function:



5.15.4 Field Documentation

5.15.4.1 const bit TDCSetup::kCoarseCountOffset = 447 `[static]`, `[private]`

5.15.4.2 const bit TDCSetup::kCoreClockDelay = 610 `[static]`, `[private]`

5.15.4.3 const bit TDCSetup::kCoreClockSource = 622 `[static]`, `[private]`

5.15.4.4 const bit TDCSetup::kDeadTime = 584 `[static]`, `[private]`

5.15.4.5 const bit TDCSetup::kDLLClockDelay = 614 `[static]`, `[private]`

5.15.4.6 const bit TDCSetup::kDLLClockSource = 624 `[static]`, `[private]`

5.15.4.7 const bit TDCSetup::kDLLControl = 580 `[static]`, `[private]`

5.15.4.8 const bit TDCSetup::kDLLMode = 592 `[static]`, `[private]`

5.15.4.9 const bit TDCSetup::kDLLTapAdjust0 = 459 `[static]`, `[private]`

5.15.4.10 const bit TDCSetup::kEnableAutomaticReject = 125 `[static]`, `[private]`

5.15.4.11 const bit TDCSetup::kEnableBytewise = 37 `[static]`, `[private]`

5.15.4.12 const bit TDCSetup::kEnableDirectBunchReset = 157 `[static]`, `[private]`

5.15.4.13 const bit TDCSetup::kEnableDirectEventReset = 156 `[static]`, `[private]`

5.15.4.14 const bit TDCSetup::kEnableDirectTrigger = 158 `[static]`, `[private]`

5.15.4.15 const bit TDCSetup::kEnableError = 6 `[static]`, `[private]`

5.15.4.16 const bit TDCSetup::kEnableErrorBypass = 5 `[static]`, `[private]`

5.15.4.17 const bit TDCSetup::kEnableErrorMark = 4 `[static]`, `[private]`

5.15.4.18 const bit TDCSetup::kEnableGlobalHeader = 34 `[static]`, `[private]`

5.15.4.19 const bit TDCSetup::kEnableGlobalTrailer = 33 `[static]`, `[private]`

5.15.4.20 const bit TDCSetup::kEnableJTAGReadout = 39 `[static]`, `[private]`

5.15.4.21 const bit TDCSetup::kEnableLocalHeader = 32 `[static]`, `[private]`

5.15.4.22 const bit TDCSetup::kEnableLocalTrailer = 31 [static], [private]

5.15.4.23 const bit TDCSetup::kEnableMasterResetCode = 151 [static], [private]

5.15.4.24 const bit TDCSetup::kEnableMasterResetOnEventReset = 152 [static], [private]

5.15.4.25 const bit TDCSetup::kEnableMatching = 639 [static], [private]

5.15.4.26 const bit TDCSetup::kEnableOverflowDetect = 123 [static], [private]

5.15.4.27 const bit TDCSetup::kEnablePair = 640 [static], [private]

5.15.4.28 const bit TDCSetup::kEnableReadoutOccupancy = 121 [static], [private]

5.15.4.29 const bit TDCSetup::kEnableReadoutSeparator = 122 [static], [private]

5.15.4.30 const bit TDCSetup::kEnableRelative = 124 [static], [private]

5.15.4.31 const bit TDCSetup::kEnableResetChannelBufferWhenSeparator = 153 [static], [private]

5.15.4.32 const bit TDCSetup::kEnableSeparatorOnBunchReset = 155 [static], [private]

5.15.4.33 const bit TDCSetup::kEnableSeparatorOnEventReset = 154 [static], [private]

5.15.4.34 const bit TDCSetup::kEnableSerial = 38 [static], [private]

5.15.4.35 const bit TDCSetup::kEnableSetCountersOnBunchReset = 150 [static], [private]

5.15.4.36 const bit TDCSetup::kEnableTTLClock = 644 [static], [private]

5.15.4.37 const bit TDCSetup::kEnableTTLControl = 642 [static], [private]

5.15.4.38 const bit TDCSetup::kEnableTTLHit = 645 [static], [private]

5.15.4.39 const bit TDCSetup::kEnableTTLReset = 643 [static], [private]

5.15.4.40 const bit TDCSetup::kEnableTTLSerial = 641 [static], [private]

5.15.4.41 const bit TDCSetup::kEventCountOffset = 126 [static], [private]

5.15.4.42 const bit TDCSetup::kIOClockDelay = 606 [static], [private]

5.15.4.43 const bit TDCSetup::kIOClockSource = 620 [static], [private]

5.15.4.44 const bit TDCSetup::kKeepToken = 35 [static], [private]

5.15.4.45 const bit TDCSetup::kLeading = 589 [static], [private]

5.15.4.46 const bit TDCSetup::kLeadingResolution = 84 [static], [private]

5.15.4.47 const bit TDCSetup::kLowPowerMode = 570 [static], [private]

5.15.4.48 const bit TDCSetup::kMaster = 36 [static], [private]

5.15.4.49 const bit TDCSetup::kMatchWindow = 72 [static], [private]

5.15.4.50 const bit TDCSetup::kMaxEventSize = 116 [static], [private]

5.15.4.51 const bit TDCSetup::kModeRC = 591 [static], [private]

5.15.4.52 const bit TDCSetup::kModeRCCompression = 590 [static], [private]

5.15.4.53 const bit TDCSetup::kOffset0 = 438 [static], [private]

5.15.4.54 const bit TDCSetup::kPLLControl = 594 [static], [private]

5.15.4.55 const bit TDCSetup::kRCAdjust0 = 555 [static], [private]

5.15.4.56 const bit TDCSetup::kReadoutFIFOSize = 45 [static], [private]

5.15.4.57 const bit TDCSetup::kReadoutSingleCycleSpeed = 17 [static], [private]

5.15.4.58 const bit TDCSetup::kReadoutSpeedSelect = 26 [static], [private]

5.15.4.59 const bit TDCSetup::kRejectCountOffset = 48 [static], [private]

5.15.4.60 const bit TDCSetup::kRejectFIFOFull = 120 [static], [private]

5.15.4.61 const bit TDCSetup::kRollOver = 627 [static], [private]

5.15.4.62 const bit TDCSetup::kSearchWindow = 60 [static], [private]

5.15.4.63 const bit TDCSetup::kSelectBypassInputs = 44 [static], [private]

5.15.4.64 const bit TDCSetup::kSerialClockDelay = 602 [static], [private]

5.15.4.65 const bit TDCSetup::kSerialClockSource = 618 [static], [private]

5.15.4.66 const bit TDCSetup::kSerialDelay = 20 [static], [private]

5.15.4.67 const bit TDCSetup::kSetupParity = 646 [static], [private]

5.15.4.68 const bit TDCSetup::kStrobeSelect = 24 [static], [private]

5.15.4.69 const bit TDCSetup::kTDCId = 40 [static], [private]

5.15.4.70 const bit TDCSetup::kTestInvert = 586 [static], [private]

5.15.4.71 const bit TDCSetup::kTestMode = 587 [static], [private]

5.15.4.72 const bit TDCSetup::kTestSelect = 0 [static], [private]

5.15.4.73 const bit TDCSetup::kTokenDelay = 27 [static], [private]

5.15.4.74 const bit TDCSetup::kTrailing = 588 [static], [private]

5.15.4.75 const bit TDCSetup::kTriggerCountOffset = 138 [static], [private]

5.15.4.76 const bit TDCSetup::kVernierOffset = 575 [static], [private]

5.15.4.77 const bit TDCSetup::kWidthSelect = 571 [static], [private]

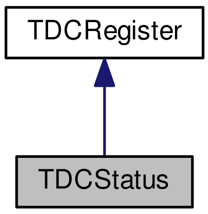
The documentation for this class was generated from the following files:

- include/TDCSetup.h
- src/TDCSetup.cpp

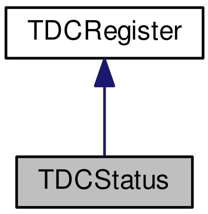
5.16 TDCStatus Class Reference

`#include <TDCStatus.h>`

Inheritance diagram for TDCStatus:



Collaboration diagram for TDCStatus:



Public Member Functions

- TDCStatus ()
- TDCStatus (const TDCStatus &s)
- void SetConstantValues ()

Static Private Attributes

- static const bit kError = 0
- static const bit kHaveToken = 11

- static const bit kReadoutFIFOOccupancy = 12
- static const bit kReadoutFIFOFull = 20
- static const bit kReadoutFIFOEmpty = 21
- static const bit kL1Occupancy = 22
- static const bit kTriggerFIFOOccupancy = 54
- static const bit kTriggerFIFOFull = 58
- static const bit kTriggerFIFOEmpty = 59
- static const bit kDLLLock = 60

Additional Inherited Members

5.16.1 Detailed Description

Author

Laurent Forthomme `laurent.forthomme@cern.ch`

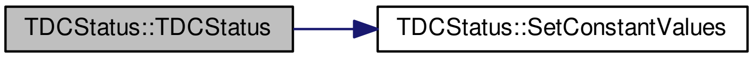
Date

27 Apr 2015

5.16.2 Constructor & Destructor Documentation

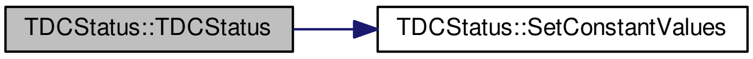
5.16.2.1 TDCStatus::TDCStatus ( ) `[inline]`

Here is the call graph for this function:



5.16.2.2 TDCStatus::TDCStatus (const TDCStatus & *s*) `[inline]`

Here is the call graph for this function:



5.16.3 Member Function Documentation

5.16.3.1 void TDCStatus::SetConstantValues ( ) [inline], [virtual]

Ensure that the critical constant values are properly set in the register word

Implements TDCRegister.

5.16.4 Field Documentation

5.16.4.1 const bit TDCStatus::kDLLLock = 60 [static], [private]

5.16.4.2 const bit TDCStatus::kError = 0 [static], [private]

5.16.4.3 const bit TDCStatus::kHaveToken = 11 [static], [private]

5.16.4.4 const bit TDCStatus::kL1Occupancy = 22 [static], [private]

5.16.4.5 const bit TDCStatus::kReadoutFIFOEmpty = 21 [static], [private]

5.16.4.6 const bit TDCStatus::kReadoutFIFOFull = 20 [static], [private]

5.16.4.7 const bit TDCStatus::kReadoutFIFOOccupancy = 12 [static], [private]

5.16.4.8 const bit TDCStatus::kTriggerFIFOEmpty = 59 [static], [private]

5.16.4.9 const bit TDCStatus::kTriggerFIFOFull = 58 [static], [private]

5.16.4.10 const bit TDCStatus::kTriggerFIFOOccupancy = 54 [static], [private]

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

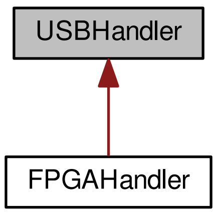
- include/TDCStatus.h

5.17 USBHandler Class Reference

Generic USB communication handler.

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

Inheritance diagram for USBHandler:



Public Member Functions

- USBHandler (const char ∗dev)
- virtual ∼USBHandler ()
- void Init ()
- void DumpDevice (libusb_device ∗dev, int verb=1, std::ostream &out=std::cout)

Protected Member Functions

- void Write (uint32_t word, uint8_t size) const

  Write a word to the USB device.
- uint32_t Fetch (uint8_t size) const

  Receive a word from the USB device.

Private Attributes

- std::string fDevice
- libusb_device_handle ∗ fHandle

5.17.1 Detailed Description

Generic USB communication handler.

Date

21 Apr 2015

Author

Laurent Forthomme `laurent.forthomme@cern.ch`

5.17.2 Constructor & Destructor Documentation

5.17.2.1 USBHandler::USBHandler (const char ∗ *dev*)

5.17.2.2 virtual USBHandler::∼USBHandler ( ) `[inline], [virtual]`

5.17.3 Member Function Documentation

5.17.3.1 void USBHandler::DumpDevice (libusb_device ∗ *dev*, int *verb* = `1`, std::ostream & *out* = `std::cout`)

5.17.3.2 uint32_t USBHandler::Fetch (uint8_t *size*) const `[inline], [protected]`

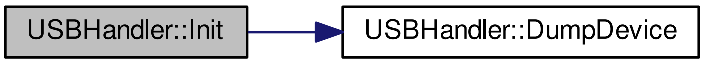
Receive a word from the USB device.

5.17.3.3 void USBHandler::Init ( )

Pointer to a pointer of devices used to retrieve a list of them

A libusb session

Here is the call graph for this function:



5.17.3.4 void USBHandler::Write (uint32_t *word,* uint8_t *size*) const [inline], [protected]

Write a word to the USB device.

5.17.4 Field Documentation

5.17.4.1 std::string USBHandler::fDevice [private]

5.17.4.2 libusb_device_handle∗ USBHandler::fHandle [private]

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

- include/USBHandler.h
- src/USBHandler.cpp

Index