

eego amplifier API description

eego rt SDK

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Chapter 1

Eemagine SDK

This document briefly documents the Eemagine SDK.

Driver setup

The SDK requires drivers to be installed in Windows. If new hardware is found, tell Windows that you have a disk and point it to the driver folder in the SDK. Windows will find the drivers for your platform and install them.

Application setup

Among the sources is a wrapper.cc file. The full file name in the driver package is eemagine\sdk\wrapper.cc. This file needs to be compiled with the application code; it contains a C++ wrapper for the c-api provided by the SDK.

Simple example

A minimal example (list all devices) to use the SDK would be:

```
// system
#include <iostream>
// eemagine
#include <eemagine/sdk/factory.h>
////////////////////////////////////
int
main(int argc, char **argv) {
    eemagine::sdk::factory factory;
    std::vector<eemagine::sdk::amplifier *> amplifiers(factory.getAmplifiers());
    for(std::vector<eemagine::sdk::amplifier *>::iterator i=amplifiers.begin();i!=amplifiers.end();++i) {
        std::cout << "amplifier:" << std::endl;
        std::cout << "    serial.... " << (*i)->getSerialNumber() << std::endl;
        delete (*i);
    }

    return 0;
}
```


Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

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Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

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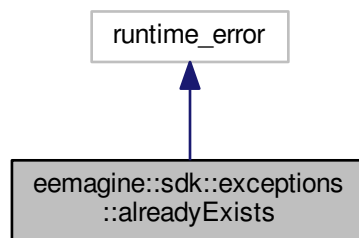
Chapter 4

Class Documentation

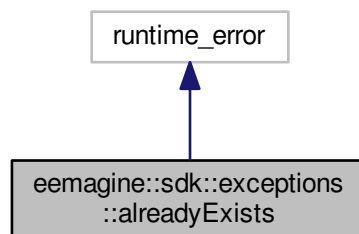
4.1 eemagine::sdk::exceptions::alreadyExists Class Reference

```
#include <exceptions.h>
```

Inheritance diagram for eemagine::sdk::exceptions::alreadyExists:



Collaboration diagram for eemagine::sdk::exceptions::alreadyExists:



Public Member Functions

- **alreadyExists** (const std::string &msg)

4.1.1 Detailed Description

exception to be used when something already exists

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

- eemagine/sdk/exceptions.h

4.2 eemagine::sdk::amplifier Class Reference

representation class for an EEG amplifier

```
#include <amplifier.h>
```

Public Member Functions

- virtual [~amplifier](#) ()
- virtual std::vector< [channel](#) > [getChannelList](#) () const =0
get a list of all channels available
- virtual std::string [getSerialNumber](#) () const =0
Returns the serial number of this amplifier.
- virtual int [getFirmwareVersion](#) () const =0
Returns the firmware version of this amplifier.
- virtual std::string [getType](#) () const =0
Returns the type of this amplifier.
- virtual std::vector< int > [getSamplingRatesAvailable](#) () const =0
get list of available sampling rates
- virtual std::vector< double > [getReferenceRangesAvailable](#) () const =0
get list of available ranges for reference channels
- virtual std::vector< double > [getBipolarRangesAvailable](#) () const =0
get list of available ranges for bipolar channels
- virtual [eemagine::sdk::stream](#) * [OpenEegStream](#) (int sampling_rate, double reference_range=1, double bipolar_range=4, unsigned long long ref_mask=0xffffffffffff, unsigned long long bip_mask=0xffffffffffff)=0
Creates an EEG stream.
- virtual [eemagine::sdk::stream](#) * [OpenImpedanceStream](#) (unsigned long long ref_mask=0xffffffffffff)=0
Creates an impedance stream.

4.2.1 Detailed Description

representation class for an EEG amplifier

4.2.2 Constructor & Destructor Documentation

4.2.2.1 ~amplifier()

```
virtual eemagine::sdk::amplifier::~~amplifier ( ) [inline], [virtual]
```

destructor

4.2.3 Member Function Documentation

4.2.3.1 getBipolarRangesAvailable()

```
virtual std::vector<double> eemagine::sdk::amplifier::getBipolarRangesAvailable ( ) const  
[pure virtual]
```

get list of available ranges for bipolar channels

Returns

list of ranges

4.2.3.2 getChannelList()

```
virtual std::vector<channel> eemagine::sdk::amplifier::getChannelList ( ) const [pure virtual]
```

get a list of all channels available

Returns

list of channel types

4.2.3.3 getFirmwareVersion()

```
virtual int eemagine::sdk::amplifier::getFirmwareVersion ( ) const [pure virtual]
```

Returns the firmware version of this amplifier.

Returns

firmware version

4.2.3.4 getReferenceRangesAvailable()

```
virtual std::vector<double> eemagine::sdk::amplifier::getReferenceRangesAvailable ( ) const  
[pure virtual]
```

get list of available ranges for reference channels

Returns

list of ranges

4.2.3.5 getSamplingRatesAvailable()

```
virtual std::vector<int> eemagine::sdk::amplifier::getSamplingRatesAvailable ( ) const [pure virtual]
```

get list of available sampling rates

Returns

list of sampling rates

4.2.3.6 getSerialNumber()

```
virtual std::string eemagine::sdk::amplifier::getSerialNumber ( ) const [pure virtual]
```

Returns the serial number of this amplifier.

Returns

serial number

4.2.3.7 getType()

```
virtual std::string eemagine::sdk::amplifier::getType ( ) const [pure virtual]
```

Returns the type of this amplifier.

Returns

type

4.2.3.8 OpenEegStream()

```
virtual eemagine::sdk::stream* eemagine::sdk::amplifier::OpenEegStream (
    int sampling_rate,
    double reference_range = 1,
    double bipolar_range = 4,
    unsigned long long ref_mask = 0xffffffffffffffff,
    unsigned long long bip_mask = 0xffffffffffffffff ) [pure virtual]
```

Creates an EEG stream.

Parameters

<i>sampling_rate</i>	the sampling rate for this stream, valid values are: 500, 512, 1000, 1024, 2000, 2048, 4000, 4096, 8000, 8192, 16000, 16384
<i>reference_range</i>	the range, in volt, for the referential channels. Valid values are: 1, 0.75, 0.15
<i>bipolar_range</i>	the range, in volt, for the bipolar channels. Valid values are: 4, 1.5, 0.7, 0.35
<i>ref_mask</i>	bitset for selecting which reference channels are used
<i>bip_mask</i>	bitset for selecting which bipolar channels are used

Returns

an object of type stream. The end-user is responsible for deleting the stream when done. The data return by the getData call on this streams contains sample values measured in Volt. Note that there may only be a maxium one stream alive at all times

4.2.3.9 OpenImpedanceStream()

```
virtual eemagine::sdk::stream* eemagine::sdk::amplifier::OpenImpedanceStream (
    unsigned long long ref_mask = 0xffffffffffffffff ) [pure virtual]
```

Creates an impedance stream.

Parameters

<i>ref_mask</i>	bitset for selecting which reference channels are used
-----------------	--

Returns

an object of type stream. The end-user is responsible for deleting the stream when done. The data return by the getData call on this streams contains sample values measured in Ohm. Note that there may only be a maxium one stream alive at all times

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

- eemagine/sdk/amplifier.h

4.3 eemagine::sdk::buffer Class Reference

Wrapper around array to provide indexed access to values.

```
#include <buffer.h>
```

Public Member Functions

- **buffer** (unsigned int channel_count=0, unsigned int sample_count=0)
default constructor
- const unsigned int & **getChannelCount** () const
get the number of channels
- const unsigned int & **getSampleCount** () const
get the number of samples
- const double & **getSample** (unsigned int channel, unsigned int sample) const
get sample value
- size_t **size** () const
get number of samples
- double * **data** ()
direct pointer to data

Protected Attributes

- std::vector< double > **_data**
- unsigned int **_channel_count**
- unsigned int **_sample_count**

4.3.1 Detailed Description

Wrapper around array to provide indexed access to values.

4.3.2 Member Function Documentation

4.3.2.1 `getChannelCount()`

```
const unsigned int& eemagine::sdk::buffer::getChannelCount ( ) const [inline]
```

get the number of channels

Returns

number of channels

4.3.2.2 `getSample()`

```
const double& eemagine::sdk::buffer::getSample (
    unsigned int channel,
    unsigned int sample ) const [inline]
```

get sample value

Parameters

<i>channel</i>	the channel index(start indexing at zero)
<i>sample</i>	the sample index(start indexing at zero)

Returns

returns that value for channel at sample

4.3.2.3 `getSampleCount()`

```
const unsigned int& eemagine::sdk::buffer::getSampleCount ( ) const [inline]
```

get the number of samples

Returns

number of samples

4.3.2.4 `size()`

```
size_t eemagine::sdk::buffer::size ( ) const [inline]
```

get number of samples

Returns

number of samples

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

- eemagine/sdk/buffer.h

4.4 eemagine::sdk::channel Class Reference

Public Types

- enum `channel_type` {
none, **reference**, **bipolar**, **trigger**,
sample_counter, **impedance_reference**, **impedance_ground**, **accelerometer**,
gyroscope, **magnetometer** }

Public Member Functions

- `channel` ()
default constructor
- **channel** (unsigned int index, `channel_type` type)
- unsigned int `getIndex` () const
get this channel's index #return this channel's index
- `channel_type` `getType` () const
get this channel's type #return this channel's type

Protected Attributes

- unsigned int **_index**
- `channel_type` **_type**

4.4.1 Member Enumeration Documentation

4.4.1.1 channel_type

```
enum eemagine::sdk::channel::channel_type
```

type of channel

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

- eemagine/sdk/channel.h

4.5 eemagine::sdk::factory Class Reference

entry point for the Eemagine SDK. The factory builds amplifiers

```
#include <factory.h>
```

Classes

- struct [version](#)

Public Member Functions

- [factory](#) (const std::string &path, void *data=NULL)
- [~factory](#) ()
- std::vector< [eemagine::sdk::amplifier](#) * > [getAmplifiers](#) ()
- [eemagine::sdk::amplifier](#) * [getAmplifier](#) ()
- [version](#) [getVersion](#) () const

4.5.1 Detailed Description

entry point for the Eemagine SDK. The factory builds amplifiers

4.5.2 Constructor & Destructor Documentation

4.5.2.1 [factory](#)()

```
eemagine::sdk::factory::factory (
    const std::string & path,
    void * data = NULL )
```

constructor

4.5.2.2 [~factory](#)()

```
eemagine::sdk::factory::~~factory ( )
```

destructor

4.5.3 Member Function Documentation

4.5.3.1 [getAmplifier](#)()

```
eemagine::sdk::amplifier* eemagine::sdk::factory::getAmplifier ( )
```

Returns a pointer to the first connected amplifier. caller is responsible to delete the pointer. this function may throw an [eemagine::sdk::exceptions::notFound](#) exception if no amplifiers are found.

Returns

pointer to an available amplifier

4.5.3.2 getAmplifiers()

```
std::vector<eemagine::sdk::amplifier*> eemagine::sdk::factory::getAmplifiers ( )
```

Returns a pointer to all available amplifiers. caller is responsible to delete the pointers.

Returns

vector of pointers to amplifiers

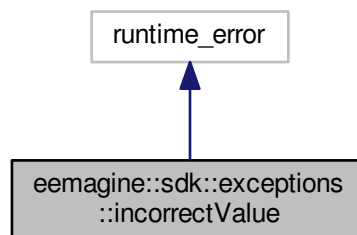
The documentation for this class was generated from the following file:

- eemagine/sdk/factory.h

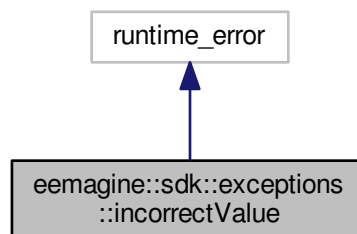
4.6 eemagine::sdk::exceptions::incorrectValue Class Reference

```
#include <exceptions.h>
```

Inheritance diagram for eemagine::sdk::exceptions::incorrectValue:



Collaboration diagram for eemagine::sdk::exceptions::incorrectValue:



Public Member Functions

- **incorrectValue** (const std::string &msg)

4.6.1 Detailed Description

can be used if an incorrect value is used

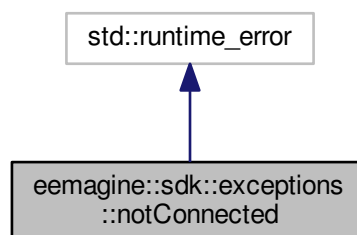
The documentation for this class was generated from the following file:

- eemagine/sdk/exceptions.h

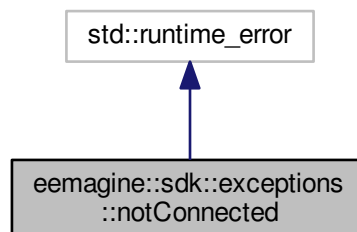
4.7 eemagine::sdk::exceptions::notConnected Class Reference

```
#include <exceptions.h>
```

Inheritance diagram for eemagine::sdk::exceptions::notConnected:



Collaboration diagram for eemagine::sdk::exceptions::notConnected:



Public Member Functions

- **notConnected** (const std::string &msg)

4.7.1 Detailed Description

exception to be used when there is no connection

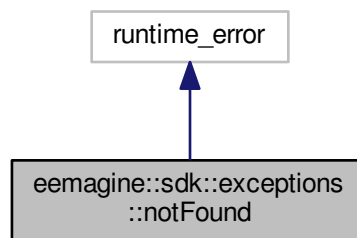
The documentation for this class was generated from the following file:

- eemagine/sdk/exceptions.h

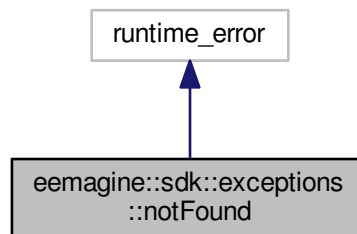
4.8 eemagine::sdk::exceptions::notFound Class Reference

```
#include <exceptions.h>
```

Inheritance diagram for eemagine::sdk::exceptions::notFound:



Collaboration diagram for eemagine::sdk::exceptions::notFound:



Public Member Functions

- **notFound** (const std::string &msg)

4.8.1 Detailed Description

exception to be used when something is not found

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

- eemagine/sdk/exceptions.h

4.9 eemagine::sdk::stream Class Reference

The class that does the actual streaming.

```
#include <stream.h>
```

Public Member Functions

- virtual `~stream()`
Destructor Destructor. It's virtual because the class has pure virtual functions.
- virtual `std::vector< channel > getChannelList()` const =0
get the list of channels for this stream get a list of all channels available for this stream
- virtual `buffer getData()`=0
*get data get data. This returns an array(vector) of samples. Is always a multiple of number of channels. In fact, the size of the returned data is channelcount * samplecount. Thus, the number of samples in the returned data can be deduced; vector.size() / number of channels the values are layed out like this: sample 0: chan 0, chan 1, chan 2, ... , chan n sample 1: chan 0, chan 1, chan 2, ... , chan n sample 2: chan 0, chan 1, chan 2, ... , chan n*

4.9.1 Detailed Description

The class that does the actual streaming.

4.9.2 Member Function Documentation

4.9.2.1 getChannelList()

```
virtual std::vector<channel> eemagine::sdk::stream::getChannelList ( ) const [pure virtual]
```

get the list of channels for this stream get a list of all channels available for this stream

Returns

list of channel types

4.9.2.2 getData()

```
virtual buffer eemagine::sdk::stream::getData ( ) [pure virtual]
```

get data get data. This returns an array(vector) of samples. Is always a multiple of number of channels. In fact, the size of the returned data is channelcount * samplecount. Thus, the number of samples in the returned data can be deduced; vector.size() / number of channels the values are layed out like this: sample 0: chan 0, chan 1, chan 2, ... , chan n sample 1: chan 0, chan 1, chan 2, ... , chan n sample 2: chan 0, chan 1, chan 2, ... , chan n

Returns

samples array

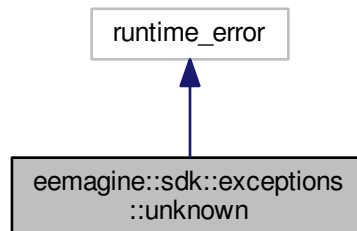
The documentation for this class was generated from the following file:

- eemagine/sdk/stream.h

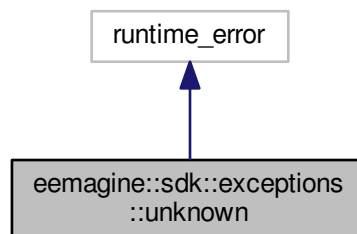
4.10 eemagine::sdk::exceptions::unknown Class Reference

```
#include <exceptions.h>
```

Inheritance diagram for eemagine::sdk::exceptions::unknown:



Collaboration diagram for eemagine::sdk::exceptions::unknown:



Public Member Functions

- **unknown** (const std::string &msg)

4.10.1 Detailed Description

can be used if an unknown error occurred

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

- eemagine/sdk/exceptions.h

4.11 eemagine::sdk::factory::version Struct Reference

```
#include <factory.h>
```

Public Attributes

- int **major**
- int **minor**
- int **micro**
- int **build**

4.11.1 Detailed Description

Get version information

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

- eemagine/sdk/factory.h

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