Multi-camera Demo

1.0

Generated by Doxygen 1.8.17

Chapter 1

Hierarchical Index

1.1 Class Hierarchy

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

Chapter 2

Class Index

2.1 Class List

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

Chapter 3

File Index

3.1 File List

Here is a list of all files with brief descriptions:

Chapter 4

Class Documentation

4.1 Buffer< Type, size > Class Template Reference

Ring buffer with mutex.

`#include <buffer.h>`

Public Member Functions

- **Buffer** ()
- ~**Buffer** ()=default
- unsigned int **Size** () const
- bool **Empty** () const

  Is this buffer empty?
- void **Push** (const Type &obj)

  Push an element.
- bool **Pop** (Type &obj)

  Pop an element.
- Type & **operator[ ]** (unsigned int id)

4.1.1 Detailed Description

template<typename Type, unsigned int size>
class Buffer< Type, size >

Ring buffer with mutex.

Template Parameters

Type	Type of elements in this ring buffer.
size	Max size of this ring buffer.

Attention

Length must be 2^N.

Definition at line 16 of file buffer.h.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 Buffer()

```
template<typename Type , unsigned int size>
Buffer< Type, size >::  Buffer ( )  [inline]
```

Definition at line 26 of file buffer.h.

4.1.2.2 ~Buffer()

```
template<typename Type , unsigned int size>
Buffer< Type, size >::~ Buffer ( )  [default]
```

4.1.3 Member Function Documentation

4.1.3.1 Empty()

```
template<typename Type , unsigned int size>
bool  Buffer< Type, size >::Empty ( ) const  [inline]
```

Is this buffer empty?

Returns

A boolean shows if ring buffer is empty.

Definition at line 42 of file buffer.h.

4.1.3.2 operator[]()

```
template<typename Type , unsigned int size>
Type&  Buffer< Type, size >::operator[] (
             unsigned int id )  [inline]
```

Definition at line 77 of file buffer.h.

4.1.3.3 Pop()

```
template<typename Type , unsigned int size>
bool  Buffer< Type, size >::Pop (
             Type & obj )  [inline]
```

Pop an element.

Parameters

out	*obj*	Output element.

Returns

A boolean shows if ring buffer is not empty.

Definition at line 66 of file buffer.h.

4.1.3.4 Push()

```
template<typename Type , unsigned int size>
void  Buffer< Type, size >::Push (
             const Type & obj )  [inline]
```

Push an element.

Parameters

in	*obj*	Input element.

Definition at line 48 of file buffer.h.

4.1.3.5 Size()

```
template<typename Type , unsigned int size>
unsigned int  Buffer< Type, size >::Size ( ) const  [inline]
```

Returns

Size of this buffer, which is specified when it is constructed.

Definition at line 36 of file buffer.h.

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

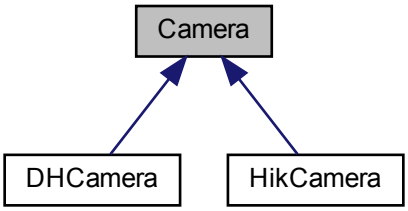
- modules/image-provider-base/ **buffer.h**

4.2 Camera Class Reference

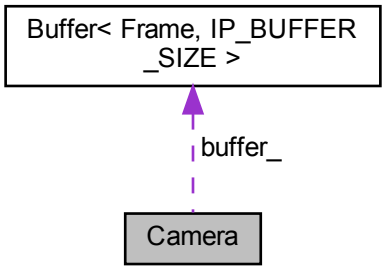
Camera (p. 10) base class.

`#include <camera_base.h>`

Inheritance diagram for Camera:



Collaboration diagram for Camera:



Public Member Functions

- **Camera** ()
- virtual ~**Camera** ()=default
- virtual bool **OpenCamera** (const std::string &serial_number, const std::string &config_file)=0

  Open a camera.
- virtual bool **CloseCamera** ()=0

  Close the opened camera.
- virtual bool **GetFrame** (**Frame** &frame)=0

  Get a frame with image and time stamp from internal image buffer.
- virtual bool **StartStream** ()=0

  Start the stream.

- virtual bool **StopStream** ()=0

  Stop the stream.
- virtual bool **IsConnected** ()=0

  Check if current device is connected.
- virtual bool **ImportConfigurationFile** (const std::string &file_path)=0

  Import current config to specified file.
- virtual bool **ExportConfigurationFile** (const std::string &file_path)=0

  Export current config to specified file.
- virtual bool **SetExposureTime** (uint32_t exposure_time)=0

  Set exposure time.
- virtual bool **SetGainValue** (float gain)=0

  Set gain value.
- std::string **GetSerialNumber** ()

  Get serial number.

Protected Attributes

- std::string **serial_number_**
- bool **stream_running_**
- pthread_t **daemon_thread_id_**
- bool **stop_daemon_thread_flag_**
- **Buffer**< **Frame**, **IP_BUFFER_SIZE** > **buffer_**

4.2.1 Detailed Description

Camera (p. 10) base class.

Note

You cannot directly construct objects.
Instead, find camera types in subclass documents, include **camera_factory.h** (p. 52) and use CF_CREAT↩E_CAMERA macro.

Definition at line 13 of file camera_base.h.

4.2.2 Constructor & Destructor Documentation

4.2.2.1 Camera()

```
Camera::Camera ( )  [inline]
```

Definition at line 15 of file camera_base.h.

4.2.2.2 ~Camera()

```
virtual Camera::~Camera ( )  [virtual], [default]
```

4.2.3 Member Function Documentation

4.2.3.1 CloseCamera()

```
virtual bool Camera::CloseCamera ( )  [pure virtual]
```

Close the opened camera.

Returns

A boolean shows whether the camera is normally closed.

Attention

No matter what is returned, the camera will not be valid.

Implemented in **DHCamera** (p. 26), and **HikCamera** (p. 35).

4.2.3.2 ExportConfigurationFile()

```
virtual bool Camera::ExportConfigurationFile (
            const std::string & file_path )  [pure virtual]
```

Export current config to specified file.

Parameters

in	*file_path*	File path.

Returns

A boolean shows if config is successfully saved.

Implemented in **DHCamera** (p. 26), and **HikCamera** (p. 36).

4.2.3.3 GetFrame()

```
virtual bool Camera::GetFrame (
              Frame & frame )  [pure virtual]
```

Get a frame with image and time stamp from internal image buffer.

Parameters

out	*frame*	Acquired frame will be stored here.

Returns

A boolean shows if buffer is not empty, or if you can successfully get an frame.

Implemented in **DHCamera** (p. 27), and **HikCamera** (p. 36).

4.2.3.4 GetSerialNumber()

```
std::string Camera::GetSerialNumber ( )  [inline]
```

Get serial number.

Returns

Serial number of this camera.

Definition at line 95 of file camera_base.h.

4.2.3.5 ImportConfigurationFile()

```
virtual bool Camera::ImportConfigurationFile (
             const std::string & file_path )  [pure virtual]
```

Import current config to specified file.

Parameters

in	*file_path*	File path.

Returns

A boolean shows if config is successfully imported.

Implemented in **DHCamera** (p. 27), and **HikCamera** (p. 37).

4.2.3.6 IsConnected()

```
virtual bool Camera::IsConnected ( )  [pure virtual]
```

Check if current device is connected.

Returns

A boolean shows current device is connected.

Implemented in **DHCamera** (p. 28), and **HikCamera** (p. 37).

4.2.3.7 OpenCamera()

```
virtual bool Camera::OpenCamera (
            const std::string & serial_number,
            const std::string & config_file )  [pure virtual]
```

Open a camera.

Parameters

in	*serial_number*	Serial number of the camera you wanna open.
in	*config_file*	Will load config from this file.

Returns

A boolean shows whether the camera is successfully opened.

Implemented in **DHCamera** (p. 28), and **HikCamera** (p. 38).

4.2.3.8 SetExposureTime()

```
virtual bool Camera::SetExposureTime (
            uint32_t exposure_time )  [pure virtual]
```

Set exposure time.

Parameters

exposure_time	Exposure time, automatically converted to corresponding data type.

Returns

A boolean shows if exposure time is successfully set.

Implemented in **DHCamera** (p. 29), and **HikCamera** (p. 39).

4.2.3.9 SetGainValue()

```
virtual bool Camera::SetGainValue (
            float gain )  [pure virtual]
```

Set gain value.

Parameters

gain	Gain value, automatically converted to corresponding data type.

Returns

A boolean shows if gain value is successfully set.

Implemented in **DHCamera** (p. 30), and **HikCamera** (p. 39).

4.2.3.10 StartStream()

```
virtual bool Camera::StartStream ( )  [pure virtual]
```

Start the stream.

Returns

Whether stream is started normally.

Attention

This function will return false when stream is already started or camera is not opened.

Implemented in **DHCamera** (p. 30), and **HikCamera** (p. 40).

4.2.3.11 StopStream()

```
virtual bool Camera::StopStream ( )  [pure virtual]
```

Stop the stream.

Returns

Whether stream is stopped normally.

Attention

This function will return false when stream is not started or camera is not opened.

Implemented in **DHCamera** (p. 31), and **HikCamera** (p. 40).

4.2.4 Member Data Documentation

4.2.4.1 buffer_

Buffer< **Frame**, **IP_BUFFER_SIZE**> Camera::buffer_ [protected]

Definition at line 102 of file camera_base.h.

4.2.4.2 daemon_thread_id_

pthread_t Camera::daemon_thread_id_ [protected]

Definition at line 100 of file camera_base.h.

4.2.4.3 serial_number_

std::string Camera::serial_number_ [protected]

Definition at line 98 of file camera_base.h.

4.2.4.4 stop_daemon_thread_flag_

bool Camera::stop_daemon_thread_flag_ [protected]

Definition at line 101 of file camera_base.h.

4.2.4.5 stream_running_

bool Camera::stream_running_ [protected]

Definition at line 99 of file camera_base.h.

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

- modules/camera-base/ **camera_base.h**

4.3 CameraFactory Class Reference

Singleton camera factory.

`#include <camera_factory.h>`

Public Member Functions

- **CameraFactory** (const **CameraFactory** &)=delete
- **CameraFactory** & **operator=** (const **CameraFactory** &)=delete
- void **RegisterCamera** (const std::string &camera_type_name, **CameraRegistryBase** *registry)

  Register a camera type.
- **Camera** * **CreateCamera** (const std::string &camera_type_name)

  Create a camera whose type is registered to factory.

Static Public Member Functions

- static **CameraFactory** & **Instance** ()

4.3.1 Detailed Description

Singleton camera factory.

Use **CameraFactory::Instance()** (p. 18) to get the only instance pointer.
Use macro **CF_CREATE_CAMERA(registered_type)** (p. 53) to create a camera instance.
Use CameraFactory::Instance::RegisterCamera(camera_type_name, *registry) to register a type of camera.

Warning

> **Camera** (p. 10) factory will not check whether CameraType is really subclass of **Camera** (p. 10) base class.
> (Thus, you should ensure that all callings of **CameraRegistry** (p. 19) constructor are completely under control.)

Definition at line 43 of file camera_factory.h.

4.3.2 Constructor & Destructor Documentation

4.3.2.1 CameraFactory()

```
CameraFactory::CameraFactory (
            const  CameraFactory &  )  [delete]
```

4.3.3 Member Function Documentation

4.3.3.1 CreateCamera()

```
Camera* CameraFactory::CreateCamera (
            const std::string & camera_type_name )  [inline]
```

Create a camera whose type is registered to factory.

Parameters

in	*camera_type_name*	Type name of camera.

Returns

A pointer to crated camera.

Note

You may use macro **CF_CREATE_CAMERA(camera_type_name)** (p. 53) instead of call this function.

Definition at line 74 of file camera_factory.h.

4.3.3.2 Instance()

```
static CameraFactory& CameraFactory::Instance ( ) [inline], [static]
```

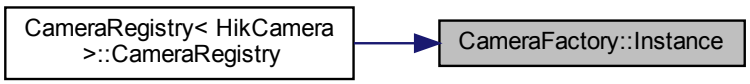
\breif Get the only instance of camera factory.

Returns

A camera factory object.

Definition at line 53 of file camera_factory.h.

Here is the caller graph for this function:



4.3.3.3 operator=()

```
CameraFactory& CameraFactory::operator= (
            const CameraFactory & ) [delete]
```

4.3.3.4 RegisterCamera()

```
void CameraFactory::RegisterCamera (
            const std::string & camera_type_name,
             CameraRegistryBase * registry ) [inline]
```

Register a camera type.

Parameters

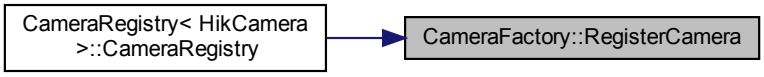
in	*camera_type_name*	Type name of camera.
in	*registry*	A registry object of camera.

Warning

You may call this function only when you're programming for a new type of camera.

Definition at line 64 of file camera_factory.h.

Here is the caller graph for this function:



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

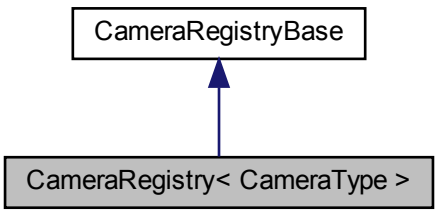
- modules/camera-base/ **camera_factory.h**

4.4 CameraRegistry< CameraType > Class Template Reference

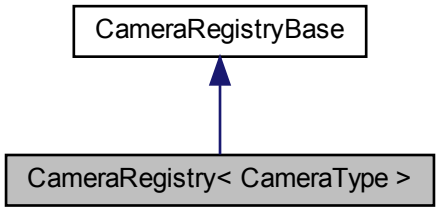
Templated camera registry class.

`#include <camera_factory.h>`

Inheritance diagram for CameraRegistry< CameraType >:



Collaboration diagram for CameraRegistry< CameraType >:



Public Member Functions

- **CameraRegistry** (const std::string &camera_type_name)
  Constructor of camera registry.
- **Camera** * **CreateCamera** () final
  Create a camera of this type.

Additional Inherited Members

4.4.1 Detailed Description

template<class CameraType>
class CameraRegistry< CameraType >

Templated camera registry class.

Template Parameters

CameraType	**Camera** (p. 10) type inherited from base class **Camera** (p. 10).

Attention

Once object is constructed, this type of camera will immediately be registered to camera factory.
This means the constructed object is useless and should not appear in any other place.
(Thus, template class though this is, it's better to be treated as a function.)

Warning

Camera (p. 10) factory will not check whether CameraType is really subclass of **Camera** (p. 10) base class.
(Thus, you should ensure that all callings of **CameraRegistry** (p. 19) constructor are completely under control.)

Definition at line 103 of file camera_factory.h.

4.4.2 Constructor & Destructor Documentation

4.4.2.1 CameraRegistry()

```
template<class CameraType >
CameraRegistry< CameraType >::  CameraRegistry (
            const std::string & camera_type_name )  [inline], [explicit]
```

Constructor of camera registry.

Parameters

in	*camera_type_name*	Type name of camera.

Definition at line 109 of file camera_factory.h.

4.4.3 Member Function Documentation

4.4.3.1 CreateCamera()

```
template<class CameraType >
Camera* CameraRegistry< CameraType >::CreateCamera ( )  [inline], [final], [virtual]
```

Create a camera of this type.

Returns

A camera pointer.

Warning

NEVER directly call this function. Instead, it should be called by camera factory.

Implements **CameraRegistryBase** (p. 23).

Definition at line 118 of file camera_factory.h.

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

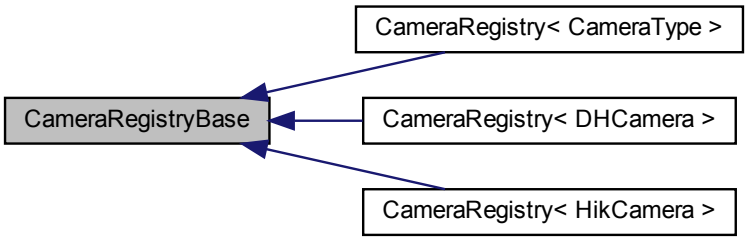
- modules/camera-base/ **camera_factory.h**

4.5 CameraRegistryBase Class Reference

Base class of camera registry.

`#include <camera_factory.h>`

Inheritance diagram for CameraRegistryBase:



Public Member Functions

- virtual **Camera** * **CreateCamera** ()=0
- **CameraRegistryBase** (const **CameraRegistryBase** &)=delete
- **CameraRegistryBase** & **operator=** (const **CameraRegistryBase** &)=delete

Protected Member Functions

- **CameraRegistryBase** ()=default
- virtual ~**CameraRegistryBase** ()=default

4.5.1 Detailed Description

Base class of camera registry.

Warning

You should use its subclass **CameraRegistry** (p. 19) instead of this base class.

Definition at line 19 of file camera_factory.h.

4.5.2 Constructor & Destructor Documentation

4.5.2.1 CameraRegistryBase() [1/2]

```
CameraRegistryBase::CameraRegistryBase (
            const  CameraRegistryBase &  )  [delete]
```

4.5.2.2 CameraRegistryBase() [2/2]

```
CameraRegistryBase::CameraRegistryBase ( )  [protected], [default]
```

4.5.2.3 ~CameraRegistryBase()

```
virtual CameraRegistryBase::~CameraRegistryBase ( )  [protected], [virtual], [default]
```

4.5.3 Member Function Documentation

4.5.3.1 CreateCamera()

```
virtual  Camera* CameraRegistryBase::CreateCamera ( )  [pure virtual]
```

Implemented in **CameraRegistry< CameraType >** (p. 21), **CameraRegistry< DHCamera >** (p. 21), and **CameraRegistry< HikCamera >** (p. 21).

4.5.3.2 operator=()

```
CameraRegistryBase& CameraRegistryBase::operator= (
            const  CameraRegistryBase &  )  [delete]
```

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

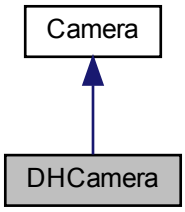
- modules/camera-base/ **camera_factory.h**

4.6 DHCamera Class Reference

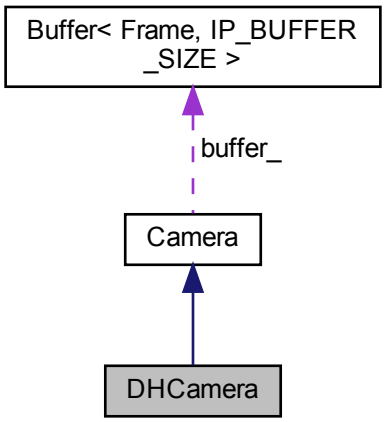
DaHeng camera class implementation.

`#include <camera_dh.h>`

Inheritance diagram for DHCamera:



Collaboration diagram for DHCamera:



Public Member Functions

- **DHCamera** ()
- **DHCamera** (const **DHCamera** &)=delete
- **DHCamera** (**DHCamera** &&)=delete
- **DHCamera** & **operator=** (const **DHCamera** &)=delete
- **DHCamera** & **operator=** (const **DHCamera** &&)=delete
- ∼**DHCamera** () final=default

- bool **OpenCamera** (const std::string &serial_number, const std::string &config_file) final

  Open a camera.
- bool **CloseCamera** () final

  Close the opened camera.
- bool **StartStream** () final

  Start the stream.
- bool **StopStream** () final

  Stop the stream.
- bool **IsConnected** () final

  Check if current device is connected.
- bool **GetFrame** (**Frame** &frame) final

  Get a frame with image and time stamp from internal image buffer.
- bool **ExportConfigurationFile** (const std::string &file_path) final

  Export current config to specified file.
- bool **ImportConfigurationFile** (const std::string &file_path) final

  Import current config to specified file.
- bool **SetExposureTime** (uint32_t exposure_time) final

  Set exposure time.
- bool **SetGainValue** (float gain_value) final

  Set gain value.

Additional Inherited Members

4.6.1 Detailed Description

DaHeng camera class implementation.

Warning

NEVER directly use this class to create camera!
Instead, turn to **CameraFactory** (p. 17) class and use CF_CREATE_CAMERA("DHCamera").

Definition at line 64 of file camera_dh.h.

4.6.2 Constructor & Destructor Documentation

4.6.2.1 DHCamera() [1/3]

```
DHCamera::DHCamera ( )  [inline]
```

Definition at line 66 of file camera_dh.h.

4.6.2.2 DHCamera() [2/3]

```
DHCamera::DHCamera (
            const  DHCamera &  )  [delete]
```

4.6.2.3 DHCamera() [3/3]

```
DHCamera::DHCamera (
             DHCamera &&  )  [delete]
```

4.6.2.4 ~DHCamera()

```
DHCamera::~DHCamera ( )  [final], [default]
```

4.6.3 Member Function Documentation

4.6.3.1 CloseCamera()

```
bool DHCamera::CloseCamera ( )  [final], [virtual]
```

Close the opened camera.

Returns

A boolean shows whether the camera is normally closed.

Attention

No matter what is returned, the camera will not be valid.

Implements **Camera** (p. 12).

Definition at line 119 of file camera_dh.cpp.

4.6.3.2 ExportConfigurationFile()

```
bool DHCamera::ExportConfigurationFile (
            const std::string & file_path )  [inline], [final], [virtual]
```

Export current config to specified file.

Parameters

in	*file_path*	File path.

Returns

A boolean shows if config is successfully saved.

Implements **Camera** (p. 12).

Definition at line 94 of file camera_dh.h.

Here is the caller graph for this function:

4.6.3.3 GetFrame()

```
bool DHCamera::GetFrame (
              Frame & frame )  [inline], [final], [virtual]
```

Get a frame with image and time stamp from internal image buffer.

Parameters

out	*frame*	Acquired frame will be stored here.

Returns

A boolean shows if buffer is not empty, or if you can successfully get an frame.

Implements **Camera** (p. 12).

Definition at line 92 of file camera_dh.h.

4.6.3.4 ImportConfigurationFile()

```
bool DHCamera::ImportConfigurationFile (
             const std::string & file_path )  [inline], [final], [virtual]
```

Import current config to specified file.

Parameters

in	*file_path*	File path.

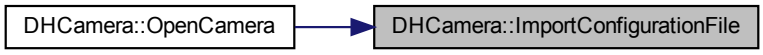
Returns

A boolean shows if config is successfully imported.

Implements **Camera** (p. 13).

Definition at line 101 of file camera_dh.h.

Here is the caller graph for this function:



4.6.3.5 IsConnected()

```
bool DHCamera::IsConnected ( )  [final], [virtual]
```

Check if current device is connected.

Returns

A boolean shows current device is connected.

Implements **Camera** (p. 13).

Definition at line 215 of file camera_dh.cpp.

4.6.3.6 OpenCamera()

```
bool DHCamera::OpenCamera (
            const std::string & serial_number,
            const std::string & config_file )  [final], [virtual]
```

Open a camera.

Parameters

in	*serial_number*	Serial number of the camera you wanna open.
in	*config_file*	Will load config from this file.

Returns

A boolean shows whether the camera is successfully opened.

Implements **Camera** (p. 14).

Definition at line 18 of file camera_dh.cpp.

Here is the call graph for this function:

4.6.3.7 operator=() [1/2]

```
DHCamera& DHCamera::operator= (
            const  DHCamera &&  )  [delete]
```

4.6.3.8 operator=() [2/2]

```
DHCamera& DHCamera::operator= (
            const  DHCamera &  )  [delete]
```

4.6.3.9 SetExposureTime()

```
bool DHCamera::SetExposureTime (
            uint32_t exposure_time )  [inline], [final], [virtual]
```

Set exposure time.

Parameters

exposure_time	Exposure time, automatically converted to corresponding data type.

Returns

A boolean shows if exposure time is successfully set.

Implements **Camera** (p. 14).

Definition at line 108 of file camera_dh.h.

4.6.3.10 SetGainValue()

```
bool DHCamera::SetGainValue (
            float gain )  [inline], [final], [virtual]
```

Set gain value.

Parameters

gain	Gain value, automatically converted to corresponding data type.

Returns

A boolean shows if gain value is successfully set.

Implements **Camera** (p. 15).

Definition at line 120 of file camera_dh.h.

4.6.3.11 StartStream()

```
bool DHCamera::StartStream ( )  [final], [virtual]
```

Start the stream.

Returns

Whether stream is started normally.

Attention

This function will return false when stream is already started or camera is not opened.

Implements **Camera** (p. 15).

Definition at line 171 of file camera_dh.cpp.

Here is the call graph for this function:

4.6.3.12 StopStream()

```
bool DHCamera::StopStream ( )  [final], [virtual]
```

Stop the stream.

Returns

Whether stream is stopped normally.

Attention

This function will return false when stream is not started or camera is not opened.

Implements **Camera** (p. 15).

Definition at line 191 of file camera_dh.cpp.

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

- modules/camera-dh/ **camera_dh.h**
- modules/camera-dh/ **camera_dh.cpp**

4.7 Frame Struct Reference

Single frame structure.

```
#include <frame.h>
```

Public Member Functions

- **Frame** (cv::Mat &_image, uint64_t _time_stamp)
- **Frame** ()

Public Attributes

- cv::Mat **image**
- uint64_t **time_stamp**

4.7.1 Detailed Description

Single frame structure.

2 ways of initializing method provided:
(Default) Directly use **Frame()** (p. 32) to initialize an empty and useless frame.
(Manual) Use **Frame(_image, _time_stamp)** (p. 31) to initialize a complete frame.

Definition at line 12 of file frame.h.

4.7.2 Constructor & Destructor Documentation

4.7.2.1 Frame() [1/2]

```
Frame::Frame (
            cv::Mat & _image,
            uint64_t _time_stamp )  [inline]
```

Definition at line 16 of file frame.h.

4.7.2.2 Frame() [2/2]

```
Frame::Frame ( )  [inline]
```

Definition at line 18 of file frame.h.

4.7.3 Member Data Documentation

4.7.3.1 image

```
cv::Mat Frame::image
```

Definition at line 13 of file frame.h.

4.7.3.2 time_stamp

```
uint64_t Frame::time_stamp
```

Definition at line 14 of file frame.h.

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

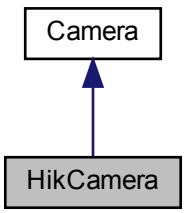
- modules/image-provider-base/ **frame.h**

4.8 HikCamera Class Reference

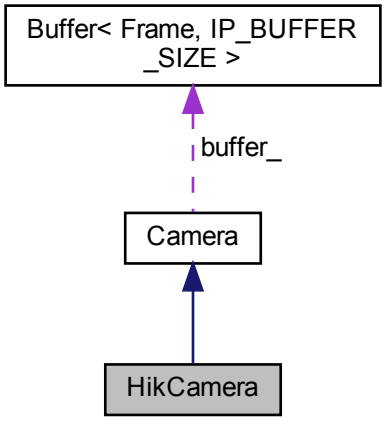
HikRobot camera class implementation.

```
#include <camera_hik.h>
```

Inheritance diagram for HikCamera:



Collaboration diagram for HikCamera:



Public Member Functions

- **HikCamera** ()
- **HikCamera** (const **HikCamera** &)=delete
- **HikCamera** (**HikCamera** &&)=delete
- **HikCamera** & **operator=** (const **HikCamera** &)=delete
- **HikCamera** & **operator=** (const **HikCamera** &&)=delete
- ~**HikCamera** () final=default
- bool **OpenCamera** (const std::string &, const std::string &) final

  Open a camera.
- bool **StartStream** () final

  Start the stream.
- bool **GetFrame** (**Frame** &frame) final

  Get a frame with image and time stamp from internal image buffer.
- bool **StopStream** () final

  Stop the stream.
- bool **CloseCamera** () final

  Close the opened camera.
- bool **IsConnected** () final

  Check if current device is connected.
- bool **ExportConfigurationFile** (const std::string &file_path) final

  Export current config to specified file.
- bool **ImportConfigurationFile** (const std::string &file_path) final

  Import current config to specified file.
- bool **SetExposureTime** (uint32_t exposure_time) final

  Set exposure time.
- bool **SetGainValue** (float gain) final

  Set gain value.

Additional Inherited Members

4.8.1 Detailed Description

HikRobot camera class implementation.

Warning

NEVER directly use this class to create camera!
Instead, turn to **CameraFactory** (p. 17) class and use CF_CREATE_CAMERA("HikCamera").

Definition at line 15 of file camera_hik.h.

4.8.2 Constructor & Destructor Documentation

4.8.2.1 HikCamera() [1/3]

```
HikCamera::HikCamera ( )  [inline]
```

Definition at line 17 of file camera_hik.h.

4.8.2.2 HikCamera() [2/3]

```
HikCamera::HikCamera (
            const  HikCamera &  )  [delete]
```

4.8.2.3 HikCamera() [3/3]

```
HikCamera::HikCamera (
             HikCamera &&  )  [delete]
```

4.8.2.4 ~HikCamera()

```
HikCamera::~HikCamera ( )  [final], [default]
```

4.8.3 Member Function Documentation

4.8.3.1 CloseCamera()

```
bool HikCamera::CloseCamera ( )  [final], [virtual]
```

Close the opened camera.

Returns

A boolean shows whether the camera is normally closed.

Attention

No matter what is returned, the camera will not be valid.

Implements **Camera** (p. 12).

Definition at line 202 of file camera_hik.cpp.

4.8.3.2 ExportConfigurationFile()

```
bool HikCamera::ExportConfigurationFile (
            const std::string & file_path )  [inline], [final], [virtual]
```

Export current config to specified file.

Parameters

in	*file_path*	File path.

Returns

A boolean shows if config is successfully saved.

Implements **Camera** (p. 12).

Definition at line 44 of file camera_hik.h.

Here is the caller graph for this function:

4.8.3.3 GetFrame()

```
bool HikCamera::GetFrame (
              Frame & frame )  [inline], [final], [virtual]
```

Get a frame with image and time stamp from internal image buffer.

Parameters

out	*frame*	Acquired frame will be stored here.

Returns

A boolean shows if buffer is not empty, or if you can successfully get an frame.

Implements **Camera** (p. 12).

Definition at line 33 of file camera_hik.h.

4.8.3.4 ImportConfigurationFile()

```
bool HikCamera::ImportConfigurationFile (
             const std::string & file_path )  [inline], [final], [virtual]
```

Import current config to specified file.

Parameters

in	*file_path*	File path.

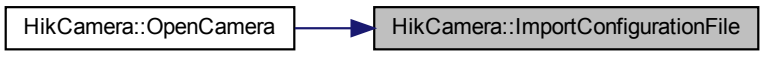
Returns

A boolean shows if config is successfully imported.

Implements **Camera** (p. 13).

Definition at line 55 of file camera_hik.h.

Here is the caller graph for this function:



4.8.3.5 IsConnected()

```
bool HikCamera::IsConnected ( )  [inline], [final], [virtual]
```

Check if current device is connected.

Returns

A boolean shows current device is connected.

Implements **Camera** (p. 13).

Definition at line 39 of file camera_hik.h.

4.8.3.6 OpenCamera()

```
bool HikCamera::OpenCamera (
            const std::string & serial_number,
            const std::string & config_file )  [final], [virtual]
```

Open a camera.

Parameters

in	*serial_number*	Serial number of the camera you wanna open.
in	*config_file*	Will load config from this file.

Returns

A boolean shows whether the camera is successfully opened.

Implements **Camera** (p. 14).

Definition at line 15 of file camera_hik.cpp.

Here is the call graph for this function:

4.8.3.7 operator=() [1/2]

```
HikCamera& HikCamera::operator= (
            const  HikCamera &&  )  [delete]
```

4.8.3.8 operator=() [2/2]

```
HikCamera& HikCamera::operator= (
            const  HikCamera &  )  [delete]
```

4.8.3.9 SetExposureTime()

```
bool HikCamera::SetExposureTime (
            uint32_t exposure_time )  [inline], [final], [virtual]
```

Set exposure time.

Parameters

exposure_time	Exposure time, automatically converted to corresponding data type.

Returns

A boolean shows if exposure time is successfully set.

Implements **Camera** (p. 14).

Definition at line 66 of file camera_hik.h.

4.8.3.10 SetGainValue()

```
bool HikCamera::SetGainValue (
            float gain )  [inline], [final], [virtual]
```

Set gain value.

Parameters

gain	Gain value, automatically converted to corresponding data type.

Returns

A boolean shows if gain value is successfully set.

Implements **Camera** (p. 15).

Definition at line 70 of file camera_hik.h.

4.8.3.11 StartStream()

```
bool HikCamera::StartStream ( )  [final], [virtual]
```

Start the stream.

Returns

Whether stream is started normally.

Attention

This function will return false when stream is already started or camera is not opened.

Implements **Camera** (p. 15).

Definition at line 146 of file camera_hik.cpp.

Here is the call graph for this function:

4.8.3.12 StopStream()

```
bool HikCamera::StopStream ( )  [final], [virtual]
```

Stop the stream.

Returns

Whether stream is stopped normally.

Attention

This function will return false when stream is not started or camera is not opened.

Implements **Camera** (p. 15).

Definition at line 185 of file camera_hik.cpp.

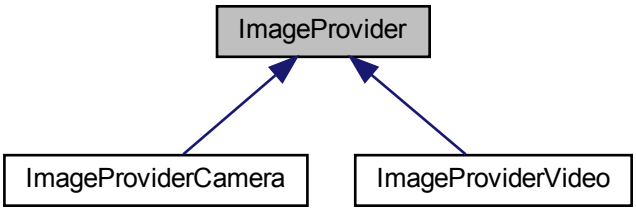
The documentation for this class was generated from the following files:

- modules/camera-hik/ **camera_hik.h**
- modules/camera-hik/ **camera_hik.cpp**

4.9 ImageProvider Class Reference

`#include <image_provider_base.h>`

Inheritance diagram for ImageProvider:



Public Member Functions

- virtual ~**ImageProvider** ()=default
- virtual bool **Initialize** (const std::string &file_path)=0

  Initialize by specified configuration file.
- virtual bool **GetFrame** (**Frame** &frame)=0

  Get a frame.

4.9.1 Detailed Description

Definition at line 7 of file image_provider_base.h.

4.9.2 Constructor & Destructor Documentation

4.9.2.1 ~ImageProvider()

```
virtual ImageProvider::~ImageProvider ( )  [virtual], [default]
```

4.9.3 Member Function Documentation

4.9.3.1 GetFrame()

```
virtual bool ImageProvider::GetFrame (
              Frame & frame )  [pure virtual]
```

Get a frame.

Parameters

out	*frame*	OpenCV image reference.

Returns

A boolean shows if frame is complete.

Implemented in **ImageProviderCamera** (p. 43).

4.9.3.2 Initialize()

```
virtual bool ImageProvider::Initialize (
            const std::string & file_path )  [pure virtual]
```

Initialize by specified configuration file.

Parameters

in	*file_path*	Configuration file path.

Returns

A boolean shows if initialization succeeded.

Implemented in **ImageProviderCamera** (p. 44).

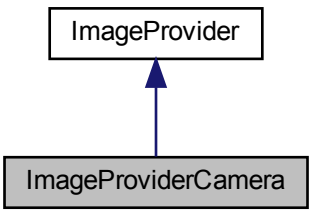
The documentation for this class was generated from the following file:

- modules/image-provider-base/ **image_provider_base.h**

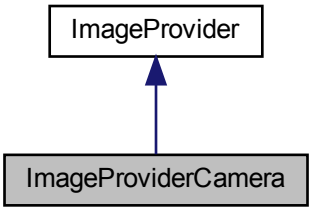
4.10 ImageProviderCamera Class Reference

`#include <image_provider_camera.h>`

Inheritance diagram for ImageProviderCamera:



Collaboration diagram for ImageProviderCamera:



Public Member Functions

- ∼**ImageProviderCamera** () final=default
- bool **Initialize** (const std::string &file_path) final

  Initialize by specified configuration file.
- bool **GetFrame** (**Frame** &) final

  Get a frame.

4.10.1 Detailed Description

Definition at line 6 of file image_provider_camera.h.

4.10.2 Constructor & Destructor Documentation

4.10.2.1 ∼ImageProviderCamera()

```
ImageProviderCamera::∼ImageProviderCamera ( )  [final], [default]
```

4.10.3 Member Function Documentation

4.10.3.1 GetFrame()

```
bool ImageProviderCamera::GetFrame (
            Frame & frame )  [inline], [final], [virtual]
```

Get a frame.

Parameters

out	*frame*	OpenCV image reference.

Returns

A boolean shows if frame is complete.

Implements **ImageProvider** (p. 41).

Definition at line 12 of file image_provider_camera.h.

4.10.3.2 Initialize()

```
bool ImageProviderCamera::Initialize (
            const std::string & file_path )  [inline], [final], [virtual]
```

Initialize by specified configuration file.

Parameters

in	*file_path*	Configuration file path.

Returns

A boolean shows if initialization succeeded.

Implements **ImageProvider** (p. 42).

Definition at line 10 of file image_provider_camera.h.

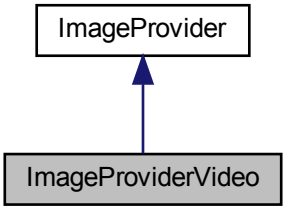
The documentation for this class was generated from the following file:

- modules/image-provider-camera/ **image_provider_camera.h**

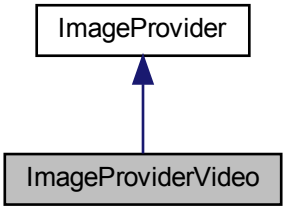
4.11 ImageProviderVideo Class Reference

```
#include <image_provider_video.h>
```

Inheritance diagram for ImageProviderVideo:



Collaboration diagram for ImageProviderVideo:



Additional Inherited Members

4.11.1 Detailed Description

Definition at line 6 of file image_provider_video.h.

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

- modules/image-provider-video/ **image_provider_video.h**

4.12 YAML Class Reference

YAML (p. 45) file operator based on OpenCV file storage.

```
#include <yaml.h>
```

Public Types

- enum **FileMode** { **READ** = cv::FileStorage::READ, **WRITE** = cv::FileStorage::WRITE, **APPEND** = cv::File↩ Storage::APPEND }

Public Member Functions

- **YAML** (std::string file_name, **FileMode** file_mode=FileMode::READ)

  YAML *(p. 45) constructor.*
- ∼**YAML** ()
- **YAML** (const **YAML** &)=delete
- **YAML** (**YAML** &&)=delete
- **YAML** & **operator=** (const **YAML** &)=delete
- **YAML** & **operator=** (const **YAML** &&)=delete
- bool **Open** ()

  Open file.
- template<typename Key , typename Value >
  void **SetData** (Key &key, Value &value)

  Set data to ***YAML*** *(p. 45) file.*
- template<typename Key , typename Value >
  void **GetData** (Key &key, Value &value)

  Get data from ***YAML*** *(p. 45) file.*

4.12.1 Detailed Description

YAML (p. 45) file operator based on OpenCV file storage.

Definition at line 9 of file yaml.h.

4.12.2 Member Enumeration Documentation

4.12.2.1 FileMode

enum **YAML::FileMode**

Enumerator

READ	
WRITE	
APPEND	

Definition at line 11 of file yaml.h.

4.12.3 Constructor & Destructor Documentation

4.12.3.1 YAML() [1/3]

```
YAML::YAML (
            std::string file_name,
             FileMode file_mode = FileMode::READ )
```

YAML (p. 45) constructor.

Parameters

file_name	File name.
file_mode	File opening method.

Definition at line 8 of file yaml.cpp.

4.12.3.2 ~YAML()

```
YAML::~YAML ( )
```

Definition at line 12 of file yaml.cpp.

4.12.3.3 YAML() [2/3]

```
YAML::YAML (
            const  YAML &  )  [delete]
```

4.12.3.4 YAML() [3/3]

```
YAML::YAML (
             YAML &&  )  [delete]
```

4.12.4 Member Function Documentation

4.12.4.1 GetData()

```
template<typename Key , typename Value >
void YAML::GetData (
            Key & key,
            Value & value )
```

Get data from **YAML** (p. 45) file.

Template Parameters

Key	Type of key.
Value	Type of value.

Parameters

in	*key*	Key name.
out	*value*	Value of key.

Definition at line 73 of file yaml.h.

4.12.4.2 Open()

```
bool YAML::Open ( )
```

Open file.

Returns

A boolean shows if file exists or can be opened.

Definition at line 14 of file yaml.cpp.

4.12.4.3 operator=() [1/2]

```
YAML& YAML::operator= (
            const  YAML &&  )  [delete]
```

4.12.4.4 operator=() [2/2]

```
YAML& YAML::operator= (
            const  YAML &  )  [delete]
```

4.12.4.5 SetData()

```
template<typename Key , typename Value >
void YAML::SetData (
            Key & key,
            Value & value )
```

Set data to **YAML** (p. 45) file.

Note

All modifications will immediately take effect.

Template Parameters

Key	Type of key.
Value	Type of value.

Parameters

in	*key*	Key name.
in	*value*	Writing value.

Definition at line 68 of file yaml.h.

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

- modules/yaml/ **yaml.h**
- modules/yaml/ **yaml.cpp**

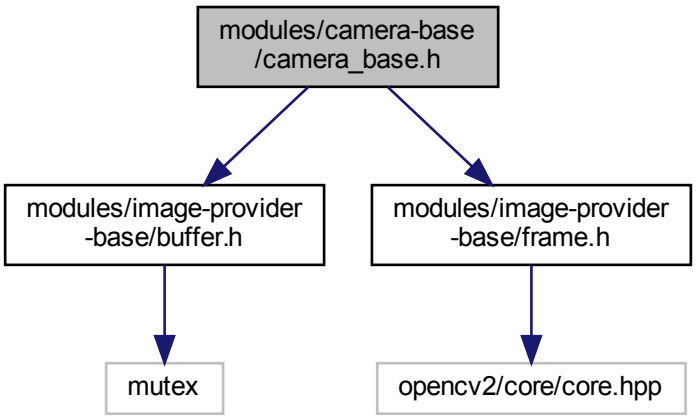
Chapter 5

File Documentation

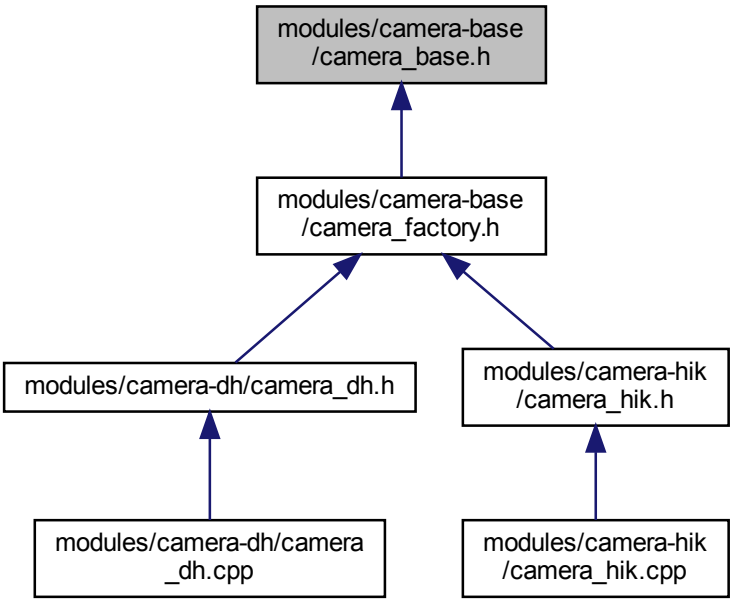
5.1 modules/camera-base/camera_base.h File Reference

```
#include "modules/image-provider-base/buffer.h"
#include "modules/image-provider-base/frame.h"
```

Include dependency graph for camera_base.h:



This graph shows which files directly or indirectly include this file:



Classes

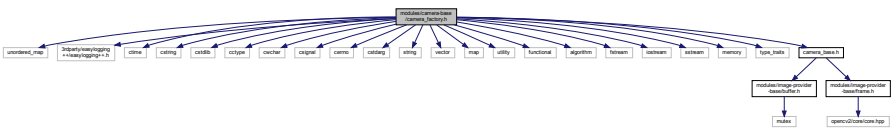
- class **Camera**

  Camera (p. *10*) *base class.*

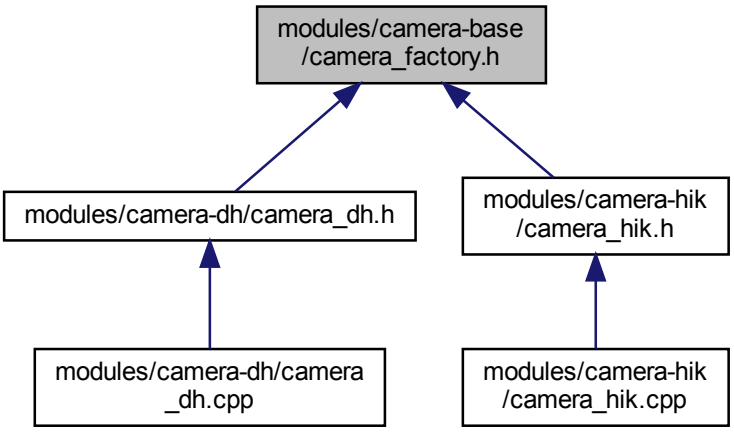
5.2 modules/camera-base/camera_factory.h File Reference

```
#include <unordered_map>
#include "3rdparty/easylogging++/easylogging++.h"
#include "camera_base.h"
```

Include dependency graph for camera_factory.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **CameraRegistryBase**

  Base class of camera registry.
- class **CameraFactory**

  Singleton camera factory.
- class **CameraRegistry**< **CameraType** >

  Templated camera registry class.

Macros

- #define **CF_CREATE_CAMERA**(camera_type_name) **CameraFactory::Instance**().CreateCamera(camera↩ _type_name)

  A macro to create a camera of specified type string. For details, turn to class ***CameraFactory*** *(p. 17).*

5.2.1 Macro Definition Documentation

5.2.1.1 CF_CREATE_CAMERA

```
#define CF_CREATE_CAMERA(
              camera_type_name )  CameraFactory::Instance().CreateCamera(camera_type_name)
```

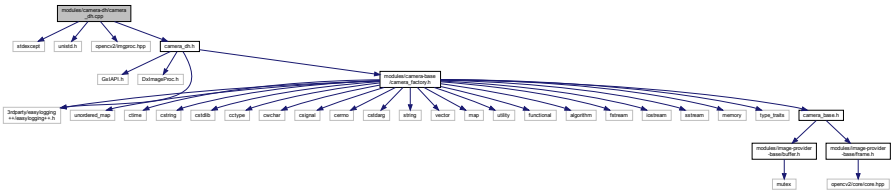
A macro to create a camera of specified type string. For details, turn to class **CameraFactory** (p. 17).

Definition at line 13 of file camera_factory.h.

5.3 modules/camera-dh/camera_dh.cpp File Reference

```
#include <stdexcept>
#include <unistd.h>
#include <opencv2/imgproc.hpp>
#include "camera_dh.h"
```

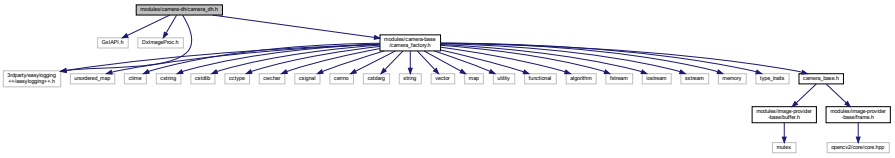
Include dependency graph for camera_dh.cpp:



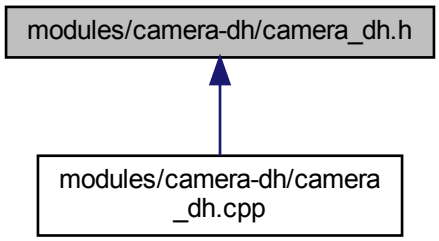
5.4 modules/camera-dh/camera_dh.h File Reference

```
#include "GxIAPI.h"
#include "DxImageProc.h"
#include "3rdparty/easylogging++/easylogging++.h"
#include "modules/camera-base/camera_factory.h"
```

Include dependency graph for camera_dh.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **DHCamera**

  DaHeng camera class implementation.

Macros

- #define **GX_OPEN_CAMERA_CHECK_STATUS**(status_code)

  This macro is used to check if the device is successfully initialized.
- #define **GX_CHECK_STATUS**(status_code)

  This macro is used to check if parameters are successfully modified or set.
- #define **GX_START_STOP_STREAM_CHECK_STATUS**(status_code)

  This macro is used to check if the stream is successfully opened or closed.

5.4.1 Macro Definition Documentation

5.4.1.1 GX_CHECK_STATUS

```
#define GX_CHECK_STATUS(
               status_code )
```

Value:

```
    if ((status_code) != GX_STATUS_SUCCESS) {  \
    LOG(ERROR) « GetErrorInfo(status_code);   \
    return false;                              \
}
```

This macro is used to check if parameters are successfully modified or set.

Attention

!! DO NOT use this macro in other place !!

Definition at line 35 of file camera_dh.h.

5.4.1.2 GX_OPEN_CAMERA_CHECK_STATUS

```
#define GX_OPEN_CAMERA_CHECK_STATUS(
               status_code )
```

Value:

```
    if ((status_code) != GX_STATUS_SUCCESS) {             \
        LOG(ERROR) « GetErrorInfo(status_code);          \
        (status_code) = GXCloseDevice(device_);           \
        if ((status_code) != GX_STATUS_SUCCESS)           \
            LOG(ERROR) « GetErrorInfo(status_code);      \
        device_ = nullptr;                                \
        serial_number_ = "";                              \
        if (!camera_count_) {                             \
            (status_code) = GXCloseLib();                 \
            if ((status_code) != GX_STATUS_SUCCESS)       \
                LOG(ERROR) « GetErrorInfo(status_code);  \
        }                                                 \
    return false;                                         \
}
```

This macro is used to check if the device is successfully initialized.

Attention

!! DO NOT use this macro in other place !!

Definition at line 15 of file camera_dh.h.

5.4.1.3 GX_START_STOP_STREAM_CHECK_STATUS

```
#define GX_START_STOP_STREAM_CHECK_STATUS(
              status_code )
```

Value:

```
if ((status_code) != GX_STATUS_SUCCESS) {                \
    if (raw_16_to_8_cache_ != nullptr) {                 \
        delete[] raw_16_to_8_cache_;                     \
        raw_16_to_8_cache_ = nullptr;                    \
    }                                                    \
    if (raw_8_to_rgb_24_cache_ != nullptr) {             \
        delete[] raw_8_to_rgb_24_cache_;                 \
        raw_8_to_rgb_24_cache_ = nullptr;                \
    }                                                    \
    LOG(ERROR) « GetErrorInfo(status_code);             \
    return false;                                        \
}
```

This macro is used to check if the stream is successfully opened or closed.

Attention

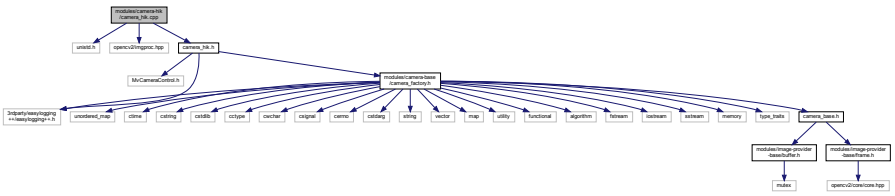
!! DO NOT use this macro in other place !!

Definition at line 45 of file camera_dh.h.

5.5 modules/camera-hik/camera_hik.cpp File Reference

```
#include <unistd.h>
#include <opencv2/imgproc.hpp>
#include "camera_hik.h"
```

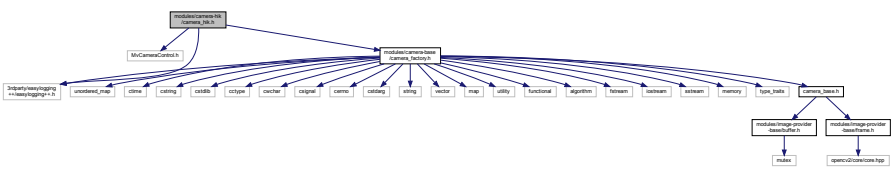
Include dependency graph for camera_hik.cpp:



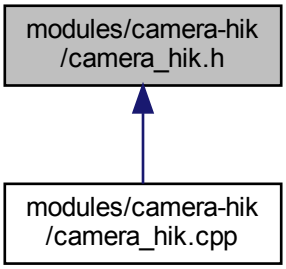
5.6 modules/camera-hik/camera_hik.h File Reference

```
#include "MvCameraControl.h"
#include "3rdparty/easylogging++/easylogging++.h"
#include "modules/camera-base/camera_factory.h"
```

Include dependency graph for camera_hik.h:



This graph shows which files directly or indirectly include this file:



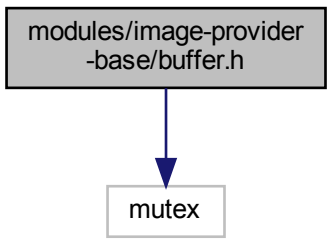
Classes

- class **HikCamera**

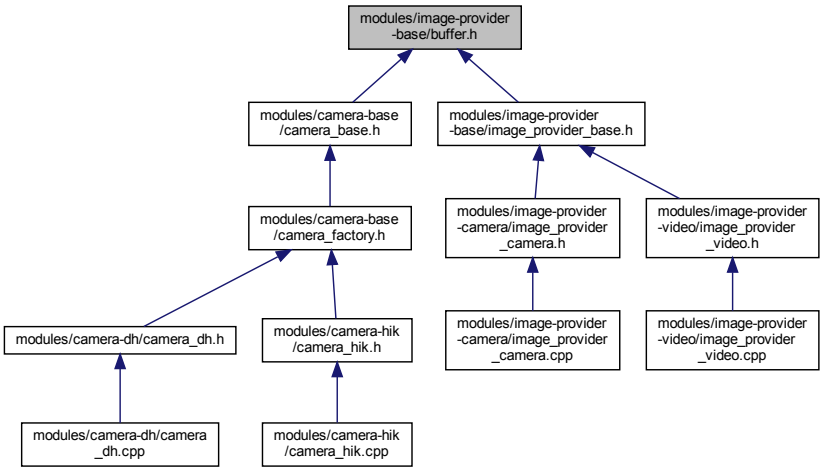
  HikRobot camera class implementation.

5.7 modules/image-provider-base/buffer.h File Reference

`#include <mutex>`
Include dependency graph for buffer.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **Buffer< Type, size >**

  Ring buffer with mutex.

Macros

- #define **IP_BUFFER_SIZE** 4

  Buffer *(p. 7) size for image provider and camera.*

5.7.1 Macro Definition Documentation

5.7.1.1 IP_BUFFER_SIZE

```
#define IP_BUFFER_SIZE 4
```

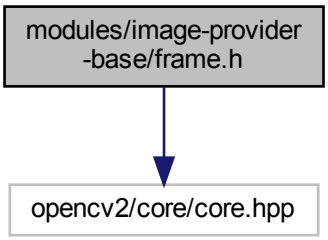
Buffer (p. 7) size for image provider and camera.

Definition at line 7 of file buffer.h.

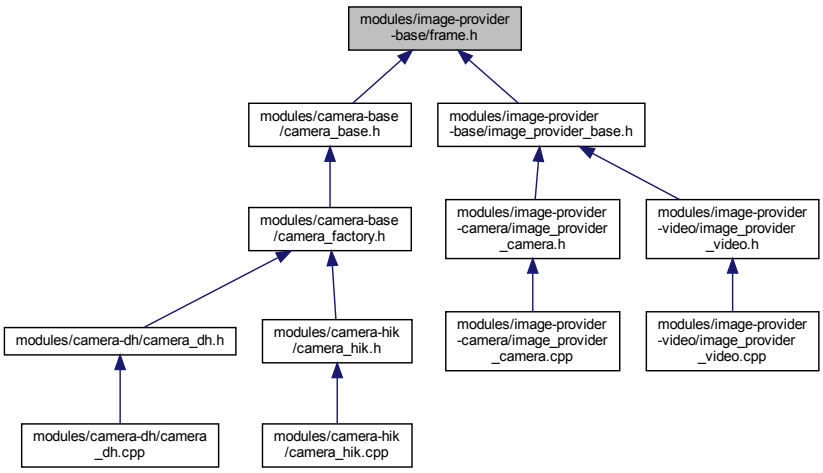
5.8 modules/image-provider-base/frame.h File Reference

```
#include <opencv2/core/core.hpp>
```

Include dependency graph for frame.h:



This graph shows which files directly or indirectly include this file:



Classes

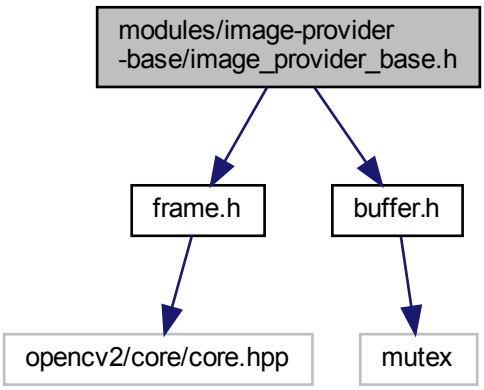
- struct **Frame**

  Single frame structure.

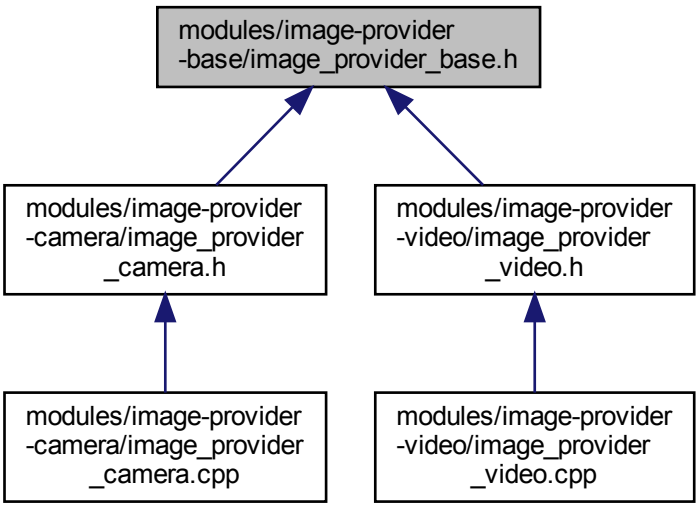
5.9 modules/image-provider-base/image_provider_base.h File Reference

```
#include "frame.h"
#include "buffer.h"
```

Include dependency graph for image_provider_base.h:



This graph shows which files directly or indirectly include this file:



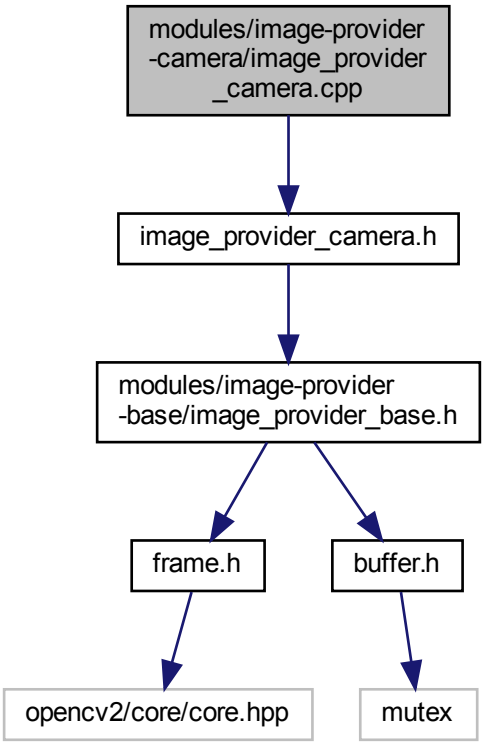
Classes

- class **ImageProvider**

5.10 modules/image-provider-camera/image_provider_camera.cpp File Reference

```
#include "image_provider_camera.h"
```

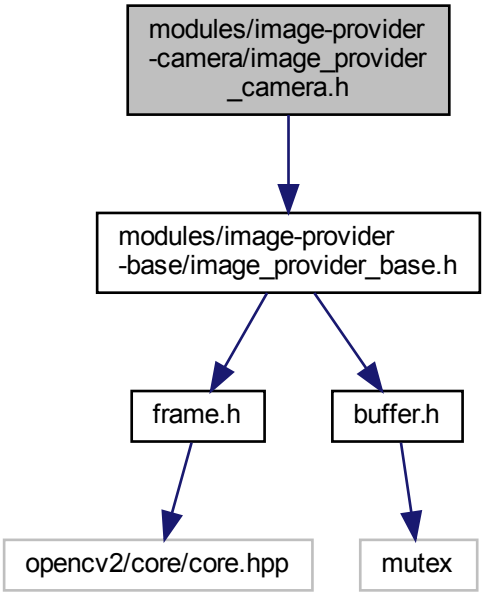
Include dependency graph for image_provider_camera.cpp:



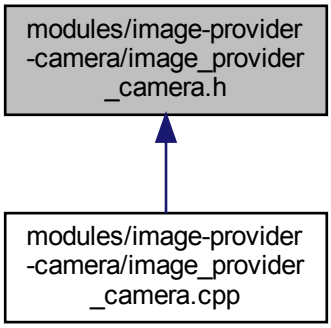
5.11 modules/image-provider-camera/image_provider_camera.h File Reference

```
#include "modules/image-provider-base/image_provider_base.h"
```

Include dependency graph for image_provider_camera.h:



This graph shows which files directly or indirectly include this file:



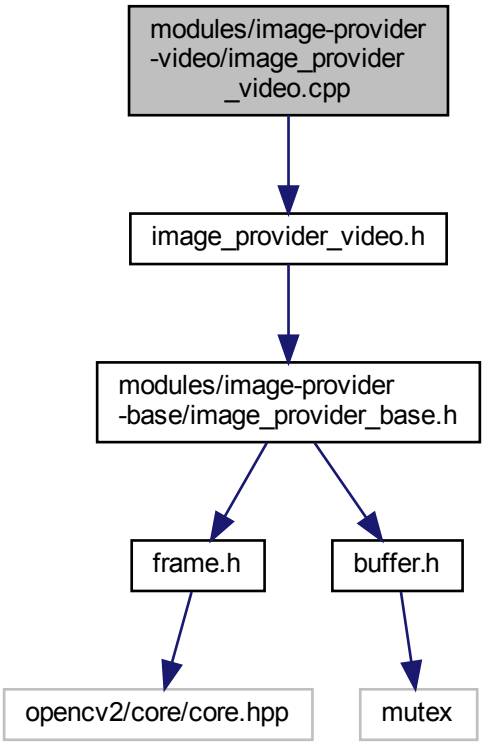
Classes

- class **ImageProviderCamera**

5.12 modules/image-provider-video/image_provider_video.cpp File Reference

```
#include "image_provider_video.h"
```

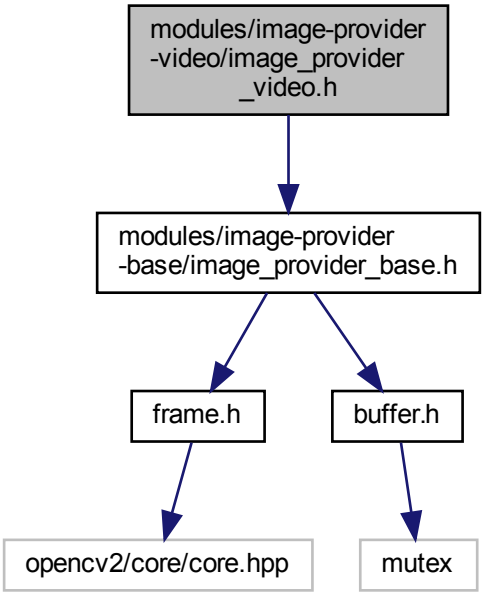
Include dependency graph for image_provider_video.cpp:



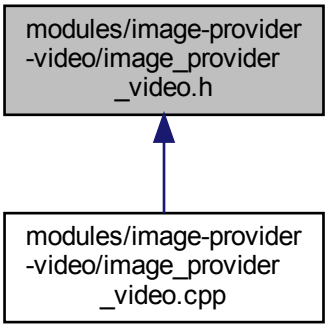
5.13 modules/image-provider-video/image_provider_video.h File Reference

```
#include "modules/image-provider-base/image_provider_base.h"
```

Include dependency graph for image_provider_video.h:



This graph shows which files directly or indirectly include this file:



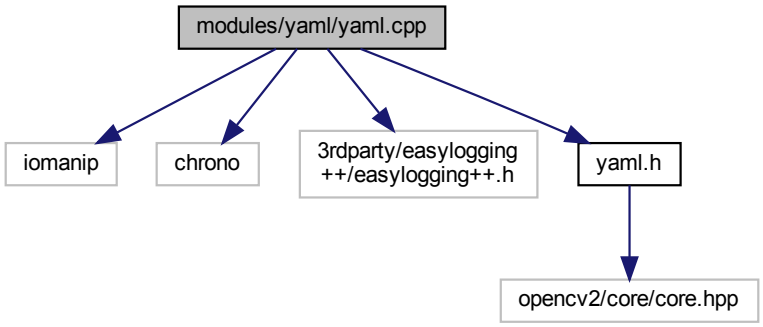
Classes

- class **ImageProviderVideo**

5.14 modules/yaml/yaml.cpp File Reference

```
#include <iomanip>
#include <chrono>
#include "3rdparty/easylogging++/easylogging++.h"
#include "yaml.h"
```

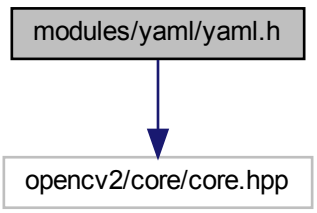
Include dependency graph for yaml.cpp:



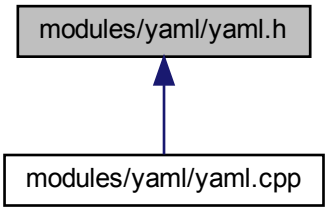
5.15 modules/yaml/yaml.h File Reference

```
#include <opencv2/core/core.hpp>
```

Include dependency graph for yaml.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **YAML**

  YAML *(p. 45) file operator based on OpenCV file storage.*

Index