

attys-comm

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1 AttysCOMM

The C++ & Python API for the Attys bluetooth data acquisition board: <http://www.attys.tech>

The library is cross platform: It's for Linux, Windows and Mac.

Installation instructions

Linux

```
cmake .  
make  
sudo make install
```

This will generate: a dynamic library libattyscomm*.so and a static one called libattyscomm_static.a.

Windows:

Under windows only the static library is generated which should be used for your code development.

```
cmake -G "Visual Studio 15 2017 Win64" .
```

and then start Visual C++ and compile it.

MacOS

For pure commandline install:

```
cmake .  
make  
make install
```

This will generate: a dynamic library libattyscomm.*dylib and a static one called libattyscomm_static.a.

If you want to debug/develop the library in Xcode:

```
cmake -G Xcode
```

Usage

A small test program is in the `examples` directory which scans for an Attys and then prints the incoming data to stdout. Type `cmake ., make` and then `./attystest` to run it.

Here is a step by guide how to code it:

1. scan for Attys

```
int ret = attysScan.scan();
```

2. Check the number of Attys detected

```
attysScan.getNAttysDevices()
```

3. If devices have been detected you can get them via `getAttysComm(0,1,2,etc)`.

4. Set the parameters, for example:

```
attysScan.getAttysComm(0)->setAdc_samplingrate_index(AttysComm::ADC_RATE_250HZ);
```

5. Register a callback (optional)

```
attysCallback = new AttysCallback(this);  
attysScan.getAttysComm(0)->registerCallback(attysCallback);
```

You need to overload the virtual function of the callback in your program.

6. Start data acquisition

```
attysScan.getAttysComm(0)->start();
```

7. Check if ringbuffer contains data and wait till true

```
attysScan.getAttysComm(n)->hasSampleAvilabale();
```

8. Get samples from buffer

```
float* values = attysScan.getAttysComm(n)->getSampleFromBuffer();
```

9. go back to 7)

10. Ending the program:

```
attysScan.getAttysComm(n)->quit();
```

Python (SWIG)

This library is fast and multi threaded. It performs the data acquisition in the background while python can then do the postprocessing.

Pre-compiled packages for Linux, Windows and MacOS are available.

Linux

Python package (pip):

Make sure you have the bluetooth development libraries:

```
sudo apt-get install libbluetooth-dev
```

and then install with:

```
pip3 install pyattyscomm
```

From source

You need to have swig-3.x installed. Then run:

```
cmake .  
make  
make install  
./setup.py install
```

and then you can load the module `pyattyscomm` system-wide!

Windows

Python package (pip):

In the python console type:

```
pip install pyattyscomm
```

From source

Install `swig` and re-run the C++ installation. Make sure to select "Release" in Visual Studio as python is usually not installed with its debug libraries. After compilation you get:

- `Release_pyattyscomm.exp`
- `Release_pyattyscomm.pyd`
- `pyattyscomm.py`

Install them with:

```
python setup.py install
```

MacOS

Python package (pip):

```
pip3 install pyattyscomm
```

From source

You need to have swig-3.x installed for homebrew. Then run:

```
cmake .
make
make install
./setup.py install
```

and then you can load the module `pyattyscomm` system-wide!

How to use

The python API is identical to the C++ one. All the definitions are in [AttysComm.h](#) and [AttysScan.h](#).

Here is an example:

```
# load the module
import pyattyscomm

# Gets the AttysScan class which scans for Attys via bluetooth
s = pyattyscomm.AttysScan()

# Scan for Attys
s.scan()

# get the 1st Attys
c = s.getAttysComm(0)

# if an attys has been found c points to it. Otherwise it's None.

# Start data acquisition in the background
c.start()

# Now we just read data at our convenience in a loop or timer or thread

while (not c.hasSampleAvilabale()):
    # do something else or nothing
    a = a + 1
    # getting a sample
    sample = c.getSampleFromBuffer()

    # do something with the sample
    print(sample)
```

Demo programs

There are demo programs which show you how to read/plot data with `pyattyscomm`:

```
readdata_demo.py
realtime_plot_demo.py
realtime_two_channel_plot.py
```

Enjoy!

<http://www.attys.tech>

2 Hierarchical Index

2.1 Class Hierarchy

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

AttysCommBase	8
AttysComm	6
AttysCommListener	21
AttysCommMessage	21
AttysScan	21
AttysScanListener	23

3 Class Index

3.1 Class List

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

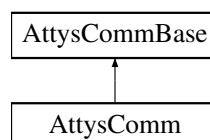
AttysComm	6
AttysCommBase	8
AttysCommListener	21
AttysCommMessage	21
AttysScan	21
AttysScanListener	23

4 Class Documentation

4.1 AttysComm Class Reference

```
#include <AttysComm.h>
```

Inheritance diagram for AttysComm:



Public Member Functions

- [AttysComm](#) (void *_btAddr=NULL, int _btAddrLen=0)
- virtual void [connect](#) ()
- virtual void [closeSocket](#) ()
- virtual void [start](#) ()
- unsigned char * [getBluetoothBinaryAddress](#) ()
- void [getBluetoothAdressString](#) (char *s)

Additional Inherited Members

4.1.1 Detailed Description

[AttysComm](#) contains all the necessary comms to talk to the Attys on both Linux and Windows.

1) Instantiate the class AttyScan and do a scan It finds all paired Attys and creates separate [AttysComm](#) classes 2) These classes are in in the array attysComm in [AttyScan](#) and the number of them in nAttysDevices. 3) All attysComm are Threads so just start the data acquisition with [start\(\)](#), for example attysComm[0]->[start\(\)](#) for the 1st Attys 4) Get the data either via the RingBuffer functions or register a callback to get the data as it arrives. [AttysComm](#) class which contains the device specific definitions and implements the abstract classes of [AttysCommBase](#). See [AttysCommBase](#) for the definitions there.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 AttysComm()

```
AttysComm::AttysComm (
    void * _btAddr = NULL,
    int _btAddrLen = 0 ) [inline]
```

Constructor: Win/Linux: takes the bluetooth device structure and its length as an argument. For Mac: just a pointer to the device.

4.1.3 Member Function Documentation

4.1.3.1 closeSocket()

```
virtual void AttysComm::closeSocket ( ) [virtual]
```

closes socket safely

Implements [AttysCommBase](#).

4.1.3.2 connect()

```
virtual void AttysComm::connect ( ) [virtual]
```

connects to the Attys by opening the socket throws exception if it fails.

Implements [AttysCommBase](#).

4.1.3.3 getBluetoothAdressString()

```
void AttysComm::getBluetoothAdressString (
    char * s ) [virtual]
```

returns the Mac address as a string

Implements [AttysCommBase](#).

4.1.3.4 getBluetoothBinaryAdress()

```
unsigned char* AttysComm::getBluetoothBinaryAdress ( ) [virtual]
```

returns an array of 14 bytes of the bluetooth address

Implements [AttysCommBase](#).

4.1.3.5 start()

```
virtual void AttysComm::start ( ) [virtual]
```

Starts the data acquisition by starting the main thread. and sending possibly init commands.

Reimplemented from [AttysCommBase](#).

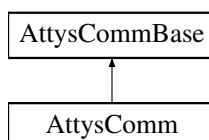
The documentation for this class was generated from the following file:

- AttysComm.h

4.2 AttysCommBase Class Reference

```
#include <AttysCommBase.h>
```

Inheritance diagram for AttysCommBase:



Public Member Functions

- void [setAdc_samplingrate_index](#) (int idx)
- int [getSamplingRateInHz](#) ()
- int [getAdc_samplingrate_index](#) ()
- float [getADCFullScaleRange](#) (int channel)
- void [setAdc0_gain_index](#) (int idx)
- void [setAdc1_gain_index](#) (int idx)
- void [setBiasCurrent](#) (int currIndex)
- int [getBiasCurrent](#) ()
- void [enableCurrents](#) (int pos_ch1, int neg_ch1, int pos_ch2)
- float [getAccelFullScaleRange](#) ()
- void [setAccel_full_scale_index](#) (int idx)
- float [getMagFullScaleRange](#) ()
- int [getIsCharging](#) ()
- virtual void [connect](#) ()=0
- virtual void [start](#) ()
- virtual void [closeSocket](#) ()=0
- int [hasActiveConnection](#) ()
- sample_p [getSampleFromBuffer](#) ()
- int [hasSampleAvailable](#) ()
- void [resetRingbuffer](#) ()
- void [registerCallback](#) (AttysCommListener *f)
- void [unregisterCallback](#) ()
- void [registerMessageCallback](#) (AttysCommMessage *f)
- void [unregisterMessageCallback](#) ()
- void [quit](#) ()
- virtual unsigned char * [getBluetoothBinaryAddress](#) ()=0
- virtual void [getBluetoothAddressString](#) (char *s)=0

Static Public Member Functions

- static float [phys2temperature](#) (float volt)

Public Attributes

- const std::string [CHANNEL_DESCRIPTION](#) [NCHANNELS]
- const std::string [CHANNEL_SHORT_DESCRIPTION](#) [NCHANNELS]
- std::string const [CHANNEL_UNITS](#) [NCHANNELS]
- const int [ADC_SAMPLINGRATE](#) [4] = { 125, 250, 500, 1000 }
- const int [ADC_GAIN_FACTOR](#) [7] = { 6, 1, 2, 3, 4, 8, 12 }
- const float [ADC_REF](#) = 2.42F
- const float [oneG](#) = 9.80665F
- const float [ACCEL_FULL_SCALE](#) [4] = { 2 * [oneG](#), 4 * [oneG](#), 8 * [oneG](#), 16 * [oneG](#) }
- const float [MAG_FULL_SCALE](#) = 4800.0E-6F

Static Public Attributes

- static const int [NCHANNELS](#) = 10
- static const int [nMem](#) = 1000 * 10
- static const int [INDEX_Acceleration_X](#) = 0
- static const int [INDEX_Acceleration_Y](#) = 1
- static const int [INDEX_Acceleration_Z](#) = 2
- static const int [INDEX_Magnetic_field_X](#) = 3
- static const int [INDEX_Magnetic_field_Y](#) = 4
- static const int [INDEX_Magnetic_field_Z](#) = 5
- static const int [INDEX_Analogue_channel_1](#) = 6
- static const int [INDEX_Analogue_channel_2](#) = 7
- static const int [INDEX_GPIO0](#) = 8
- static const int [INDEX_GPIO1](#) = 9
- static const int [ADC_RATE_125HZ](#) = 0
- static const int [ADC_RATE_250HZ](#) = 1
- static const int [ADC_RATE_500Hz](#) = 2
- static const int [ADC_DEFAULT_RATE](#) = [ADC_RATE_250HZ](#)
- static const int [ADC_GAIN_6](#) = 0
- static const int [ADC_GAIN_1](#) = 1
- static const int [ADC_GAIN_2](#) = 2
- static const int [ADC_GAIN_3](#) = 3
- static const int [ADC_GAIN_4](#) = 4
- static const int [ADC_GAIN_8](#) = 5
- static const int [ADC_GAIN_12](#) = 6
- static const int [ADC_CURRENT_6NA](#) = 0
- static const int [ADC_CURRENT_22NA](#) = 1
- static const int [ADC_CURRENT_6UA](#) = 2
- static const int [ADC_CURRENT_22UA](#) = 3
- static const int [ADC_MUX_NORMAL](#) = 0
- static const int [ADC_MUX_SHORT](#) = 1
- static const int [ADC_MUX_SUPPLY](#) = 3
- static const int [ADC_MUX_TEMPERATURE](#) = 4
- static const int [ADC_MUX_TEST_SIGNAL](#) = 5
- static const int [ADC_MUX_ECG_EINTHOVEN](#) = 6
- static const int [ACCEL_2G](#) = 0
- static const int [ACCEL_4G](#) = 1
- static const int [ACCEL_8G](#) = 2
- static const int [ACCEL_16G](#) = 3
- static const int [MESSAGE_CONNECTED](#) = 0
- static const int [MESSAGE_ERROR](#) = 1
- static const int [MESSAGE_TIMEOUT](#) = 7
- static const int [MESSAGE_RECONNECTED](#) = 8
- static const int [MESSAGE_RECEIVING_DATA](#) = 9

4.2.1 Detailed Description

Platform independent definitions for the Attys

4.2.2 Member Function Documentation

4.2.2.1 closeSocket()

```
virtual void AttysCommBase::closeSocket ( ) [pure virtual]
```

closes socket safely

Implemented in [AttysComm](#).

4.2.2.2 connect()

```
virtual void AttysCommBase::connect ( ) [pure virtual]
```

connects to the Attys by opening the socket throws exception if it fails.

Implemented in [AttysComm](#).

4.2.2.3 enableCurrents()

```
void AttysCommBase::enableCurrents (
    int pos_ch1,
    int neg_ch1,
    int pos_ch2 ) [inline]
```

Switches bias currents on

4.2.2.4 getAccelFullScaleRange()

```
float AttysCommBase::getAccelFullScaleRange ( ) [inline]
```

Returns the accelerometer current full scale reading in m/s²

4.2.2.5 getAdc_samplingrate_index()

```
int AttysCommBase::getAdc_samplingrate_index ( ) [inline]
```

Gets the sampling rate in form for the index.

4.2.2.6 getADCFullScaleRange()

```
float AttysCommBase::getADCFullScaleRange (
    int channel ) [inline]
```

Gets the ADC full range. This depends on the gain setting of the ADC.

4.2.2.7 getBiasCurrent()

```
int AttysCommBase::getBiasCurrent ( ) [inline]
```

Gets the bias current as in index.

4.2.2.8 getBluetoothAdressString()

```
virtual void AttysCommBase::getBluetoothAdressString (
    char * s ) [pure virtual]
```

returns the Mac address as a string

Implemented in [AttysComm](#).

4.2.2.9 getBluetoothBinaryAdress()

```
virtual unsigned char* AttysCommBase::getBluetoothBinaryAdress ( ) [pure virtual]
```

returns an array of 14 bytes of the bluetooth address

Implemented in [AttysComm](#).

4.2.2.10 getIsCharging()

```
int AttysCommBase::getIsCharging ( ) [inline]
```

Charging indicator. Returns one if charging.

4.2.2.11 getMagFullScaleRange()

```
float AttysCommBase::getMagFullScaleRange ( ) [inline]
```

Returns the full scale magnetometer in Tesla

4.2.2.12 getSampleFromBuffer()

```
sample_p AttysCommBase::getSampleFromBuffer ( )
```

Gets a sample from the ringbuffer. This is a C array of all samples.

4.2.2.13 getSamplingRateInHz()

```
int AttysCommBase::getSamplingRateInHz ( ) [inline]
```

Gets the sampling rate in Hz (not index number)

4.2.2.14 hasActiveConnection()

```
int AttysCommBase::hasActiveConnection ( ) [inline]
```

Returns 1 if the connection is active.

4.2.2.15 hasSampleAvailable()

```
int AttysCommBase::hasSampleAvailable ( ) [inline]
```

Is one if samples are available in the ringbuffer

4.2.2.16 phys2temperature()

```
static float AttysCommBase::phys2temperature (
    float volt ) [inline], [static]
```

Temperature

4.2.2.17 quit()

```
void AttysCommBase::quit ( )
```

Call this from the main activity to shutdown the connection

4.2.2.18 registerCallback()

```
void AttysCommBase::registerCallback (
    AttysCommListener * f ) [inline]
```

Realtime callback function which is called whenever a sample has arrived. Implemented as an interface.

4.2.2.19 registerMessageCallback()

```
void AttysCommBase::registerMessageCallback (
    AttysCommMessage * f ) [inline]
```

Callback function which is called whenever a special error/event has occurred.

4.2.2.20 resetRingbuffer()

```
void AttysCommBase::resetRingbuffer ( ) [inline]
```

Resets the ringbuffer to zero content

4.2.2.21 setAccel_full_scale_index()

```
void AttysCommBase::setAccel_full_scale_index (
    int idx ) [inline]
```

Sets the accelerometer full scale range using the index.

4.2.2.22 setAdc0_gain_index()

```
void AttysCommBase::setAdc0_gain_index (
    int idx ) [inline]
```

Gets the gain index for ADC1

4.2.2.23 setAdc1_gain_index()

```
void AttysCommBase::setAdc1_gain_index (
    int idx ) [inline]
```

Gets the gain index for ADC2

4.2.2.24 setAdc_samplingrate_index()

```
void AttysCommBase::setAdc_samplingrate_index (
    int idx ) [inline]
```

Sets the sampling rate using the sampling rate index numbers.

4.2.2.25 setBiasCurrent()

```
void AttysCommBase::setBiasCurrent (
    int currIndex ) [inline]
```

Sets the bias current which can be switched on.

4.2.2.26 start()

```
virtual void AttysCommBase::start ( ) [inline], [virtual]
```

Starts the data acquisition by starting the main thread. and sending possibly init commands.

Reimplemented in [AttysComm](#).

4.2.2.27 unregisterCallback()

```
void AttysCommBase::unregisterCallback ( ) [inline]
```

Unregister the sample callback

4.2.2.28 unregisterMessageCallback()

```
void AttysCommBase::unregisterMessageCallback ( ) [inline]
```

Unregister the message callback.

4.2.3 Member Data Documentation

4.2.3.1 ACCEL_16G

```
const int AttysCommBase::ACCEL_16G = 3 [static]
```

Setting full scale range of the accelerometer to 16G

4.2.3.2 ACCEL_2G

```
const int AttysCommBase::ACCEL_2G = 0 [static]
```

Setting full scale range of the accelerometer to 2G

4.2.3.3 ACCEL_4G

```
const int AttysCommBase::ACCEL_4G = 1 [static]
```

Setting full scale range of the accelerometer to 4G

4.2.3.4 ACCEL_8G

```
const int AttysCommBase::ACCEL_8G = 2 [static]
```

Setting full scale range of the accelerometer to 8G

4.2.3.5 ACCEL_FULL_SCALE

```
const float AttysCommBase::ACCEL_FULL_SCALE[4] = { 2 * oneG, 4 * oneG, 8 * oneG, 16 * oneG }
```

Mapping of the index to the full scale accelerations

4.2.3.6 ADC_CURRENT_22NA

```
const int AttysCommBase::ADC_CURRENT_22NA = 1 [static]
```

Bias current of 22nA

4.2.3.7 ADC_CURRENT_22UA

```
const int AttysCommBase::ADC_CURRENT_22UA = 3 [static]
```

Bias current of 22uA

4.2.3.8 ADC_CURRENT_6NA

```
const int AttysCommBase::ADC_CURRENT_6NA = 0 [static]
```

Bias current of 6nA

4.2.3.9 ADC_CURRENT_6UA

```
const int AttysCommBase::ADC_CURRENT_6UA = 2 [static]
```

Bias current of 6uA

4.2.3.10 ADC_DEFAULT_RATE

```
const int AttysCommBase::ADC_DEFAULT_RATE = ADC_RATE_250HZ [static]
```

Constant defining the default sampling rate (250Hz)

4.2.3.11 ADC_GAIN_1

```
const int AttysCommBase::ADC_GAIN_1 = 1 [static]
```

Gain index setting it to gain 6.

4.2.3.12 ADC_GAIN_12

```
const int AttysCommBase::ADC_GAIN_12 = 6 [static]
```

Gain index setting it to gain 6.

4.2.3.13 ADC_GAIN_2

```
const int AttysCommBase::ADC_GAIN_2 = 2 [static]
```

Gain index setting it to gain 2.

4.2.3.14 ADC_GAIN_3

```
const int AttysCommBase::ADC_GAIN_3 = 3 [static]
```

Gain index setting it to gain 3.

4.2.3.15 ADC_GAIN_4

```
const int AttysCommBase::ADC_GAIN_4 = 4 [static]
```

Gain index setting it to gain 4.

4.2.3.16 ADC_GAIN_6

```
const int AttysCommBase::ADC_GAIN_6 = 0 [static]
```

Gain index setting it to gain 6.

4.2.3.17 ADC_GAIN_8

```
const int AttysCommBase::ADC_GAIN_8 = 5 [static]
```

Gain index setting it to gain 5.

4.2.3.18 ADC_GAIN_FACTOR

```
const int AttysCommBase::ADC_GAIN_FACTOR[7] = { 6, 1, 2, 3, 4, 8, 12 }
```

Mmapping between index and actual gain.

4.2.3.19 ADC_MUX_ECG_EINTHOVEN

```
const int AttysCommBase::ADC_MUX_ECG_EINTHOVEN = 6 [static]
```

Multiplexer routing: both positive ADC inputs are connected together

4.2.3.20 ADC_MUX_NORMAL

```
const int AttysCommBase::ADC_MUX_NORMAL = 0 [static]
```

Multiplexer routing is normal: ADC1 and ADC2 are connected to the sigma/delta

4.2.3.21 ADC_MUX_SHORT

```
const int AttysCommBase::ADC_MUX_SHORT = 1 [static]
```

Multiplexer routing: inputs are short circuited

4.2.3.22 ADC_MUX_SUPPLY

```
const int AttysCommBase::ADC_MUX_SUPPLY = 3 [static]
```

Multiplexer routing: inputs are connected to power supply

4.2.3.23 ADC_MUX_TEMPERATURE

```
const int AttysCommBase::ADC_MUX_TEMPERATURE = 4 [static]
```

Multiplexer routing: ADC measures internal temperature

4.2.3.24 ADC_MUX_TEST_SIGNAL

```
const int AttysCommBase::ADC_MUX_TEST_SIGNAL = 5 [static]
```

Multiplexer routing: ADC measures test signal

4.2.3.25 ADC_RATE_125HZ

```
const int AttysCommBase::ADC_RATE_125HZ = 0 [static]
```

Constant defining sampling rate of 125Hz

4.2.3.26 ADC_RATE_250HZ

```
const int AttysCommBase::ADC_RATE_250HZ = 1 [static]
```

Constant defining sampling rate of 250Hz

4.2.3.27 ADC_RATE_500Hz

```
const int AttysCommBase::ADC_RATE_500Hz = 2 [static]
```

Constant defining sampling rate of 500Hz

4.2.3.28 ADC_REF

```
const float AttysCommBase::ADC_REF = 2.42F
```

The voltage reference of the ADC in volts

4.2.3.29 ADC_SAMPLINGRATE

```
const int AttysCommBase::ADC_SAMPLINGRATE[4] = { 125, 250, 500, 1000 }
```

Array of the sampling rates mapping the index to the actual sampling rate.

4.2.3.30 CHANNEL_DESCRIPTION

```
const std::string AttysCommBase::CHANNEL_DESCRIPTION[NCHANNELS]
```

Initial value:

```
= {
    "Acceleration X",
    "Acceleration Y",
    "Acceleration Z",
    "Magnetic field X",
    "Magnetic field Y",
    "Magnetic field Z",
    "Analogue channel 1",
    "Analogue channel 2",
    "DIN channel 0",
    "DIN channel 1",
    "Charging status"
}
```

Long descriptions of the channels in text form

4.2.3.31 CHANNEL_SHORT_DESCRIPTION

```
const std::string AttysCommBase::CHANNEL_SHORT_DESCRIPTION[NCHANNELS]
```

Initial value:

```
= {
    "Acc X",
    "Acc Y",
    "Acc Z",
    "Mag X",
    "Mag Y",
    "Mag Z",
    "ADC 1",
    "ADC 2",
    "DIN 0",
    "DIN 1",
}
```

Short descriptions of the channels in text form

4.2.3.32 CHANNEL_UNITS

```
std::string const AttysCommBase::CHANNEL_UNITS[NCHANNELS]
```

Initial value:

```
= {
    "m/s^2",
    "m/s^2",
    "m/s^2",
    "T",
    "T",
    "T",
    "T",
    "V",
    "V",
    " ",
    " "
}
```

Units of the channels

4.2.3.33 INDEX_Acceleration_X

```
const int AttysCommBase::INDEX_Acceleration_X = 0 [static]
```

Channel index for X Acceleration

4.2.3.34 INDEX_Acceleration_Y

```
const int AttysCommBase::INDEX_Acceleration_Y = 1 [static]
```

Channel index for Y Acceleration

4.2.3.35 INDEX_Acceleration_Z

```
const int AttysCommBase::INDEX_Acceleration_Z = 2 [static]
```

Channel index for Z Acceleration

4.2.3.36 INDEX_Analogue_channel_1

```
const int AttysCommBase::INDEX_Analogue_channel_1 = 6 [static]
```

Index of analogue channel 1

4.2.3.37 INDEX_Analogue_channel_2

```
const int AttysCommBase::INDEX_Analogue_channel_2 = 7 [static]
```

Index of analogue channel 2

4.2.3.38 INDEX_GPIO0

```
const int AttysCommBase::INDEX_GPIO0 = 8 [static]
```

Index of the internal GPIO pin 1

4.2.3.39 INDEX_GPIO1

```
const int AttysCommBase::INDEX_GPIO1 = 9 [static]
```

Index of the internal GPIO pin 2

4.2.3.40 INDEX_Magnetic_field_X

```
const int AttysCommBase::INDEX_Magnetic_field_X = 3 [static]
```

Magnetic field in X direction

4.2.3.41 INDEX_Magnetic_field_Y

```
const int AttysCommBase::INDEX_Magnetic_field_Y = 4 [static]
```

Magnetic field in Y direction

4.2.3.42 INDEX_Magnetic_field_Z

```
const int AttysCommBase::INDEX_Magnetic_field_Z = 5 [static]
```

Magnetic field in Z direction

4.2.3.43 MAG_FULL_SCALE

```
const float AttysCommBase::MAG_FULL_SCALE = 4800.0E-6F
```

Full scale range of the magnetometer in Tesla

4.2.3.44 MESSAGE_CONNECTED

```
const int AttysCommBase::MESSAGE_CONNECTED = 0 [static]
```

Message callback: Connected.

4.2.3.45 MESSAGE_ERROR

```
const int AttysCommBase::MESSAGE_ERROR = 1 [static]
```

Message callback: Generic error.

4.2.3.46 MESSAGE_RECEIVING_DATA

```
const int AttysCommBase::MESSAGE_RECEIVING_DATA = 9 [static]
```

Message callback: Receiving data.

4.2.3.47 MESSAGE_RECONNECTED

```
const int AttysCommBase::MESSAGE_RECONNECTED = 8 [static]
```

Message callback: Managed to reconnect.

4.2.3.48 MESSAGE_TIMEOUT

```
const int AttysCommBase::MESSAGE_TIMEOUT = 7 [static]
```

Message callback: Reception timeout detected by the watchdog.

4.2.3.49 NCHANNELS

```
const int AttysCommBase::NCHANNELS = 10 [static]
```

Total number of channels per samples.

4.2.3.50 nMem

```
const int AttysCommBase::nMem = 1000 * 10 [static]
```

Number of entries in the ringbuffer. Buffer for 10secs at 1kHz.

4.2.3.51 oneG

```
const float AttysCommBase::oneG = 9.80665F
```

One g in m/s²

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

- AttysCommBase.h

4.3 AttysCommListener Struct Reference

```
#include <AttysCommBase.h>
```

4.3.1 Detailed Description

callback when a sample has arrived

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

- AttysCommBase.h

4.4 AttysCommMessage Struct Reference

```
#include <AttysCommBase.h>
```

4.4.1 Detailed Description

callback when an error has occurred

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

- AttysCommBase.h

4.5 AttysScan Class Reference

```
#include <AttysScan.h>
```

Public Member Functions

- int [scan](#) (int maxAttys=1)
- void [registerCallback](#) ([AttysScanListener](#) *f)
- void [unregisterCallback](#) ()
- [AttysComm](#) * [getAttysComm](#) (int i)
- char * [getAttysName](#) (int i)
- int [getNAttysDevices](#) ()

Static Public Attributes

- static const int [SCAN_CONNECTED](#) = 0
- static const int [SCAN_SEARCHING](#) = 1
- static const int [SCAN_NODEV](#) = 2
- static const int [SCAN_SOCKETERR](#) = 3
- static const int [SCAN_CONNECTING](#) = 4
- static const int [SCAN_CONNECTERR](#) = 5
- static const int [MAX_ATTYS_DEVS](#) = 4

4.5.1 Detailed Description

Scans for Attys and creates instances of [AttysComm](#) for every detected/paired Attys. There is no need to create instances of [AttysComm](#) yourself. This is done by this class automatically.

4.5.2 Member Function Documentation

4.5.2.1 [getAttysComm\(\)](#)

```
AttysComm* AttysScan::getAttysComm (
    int i ) [inline]
```

Obtains the pointer to a valid [AttysComm](#) class which has been successfully detected while scanning.

4.5.2.2 [getAttysName\(\)](#)

```
char* AttysScan::getAttysName (
    int i ) [inline]
```

Gets the Attys name as reported by the bluetooth manager

4.5.2.3 [getNAttysDevices\(\)](#)

```
int AttysScan::getNAttysDevices ( ) [inline]
```

Returns the number of Attys devices

4.5.2.4 [registerCallback\(\)](#)

```
void AttysScan::registerCallback (
    AttysScanListener * f ) [inline]
```

Register callback which reports the scanning progress for example for a splash screen.

4.5.2.5 [scan\(\)](#)

```
int AttysScan::scan (
    int maxAttys = 1 )
```

Scans for the specified number of devices and connects to them. By default only for one Attys. returns 0 on success

4.5.2.6 unregisterCallback()

```
void AttysScan::unregisterCallback ( ) [inline]
```

Unregisters the callback

4.5.3 Member Data Documentation

4.5.3.1 MAX_ATTYS_DEVS

```
const int AttysScan::MAX_ATTYS_DEVS = 4 [static]
```

Max number of Attys Devices

4.5.3.2 SCAN_CONNECTED

```
const int AttysScan::SCAN_CONNECTED = 0 [static]
```

Message index that the connection to an attys has been successful.

4.5.3.3 SCAN_CONNECTERR

```
const int AttysScan::SCAN_CONNECTERR = 5 [static]
```

Connection error during scanning

4.5.3.4 SCAN_CONNECTING

```
const int AttysScan::SCAN_CONNECTING = 4 [static]
```

In the process of connecting

4.5.3.5 SCAN_NODEV

```
const int AttysScan::SCAN_NODEV = 2 [static]
```

Message index that no Attys has been detected

4.5.3.6 SCAN_SEARCHING

```
const int AttysScan::SCAN_SEARCHING = 1 [static]
```

Message index that [AttysScan](#) is actively scanning

4.5.3.7 SCAN_SOCKETERR

```
const int AttysScan::SCAN_SOCKETERR = 3 [static]
```

Message that the socket could not be opened

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

- AttysScan.h

4.6 AttysScanListener Struct Reference

```
#include <AttysScan.h>
```

4.6.1 Detailed Description

Callback which reports the status of the scanner

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

- AttysScan.h

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