ModbusLib

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Chapter 1

ModbusLib

1.0.1 Overview

ModbusLib is a free, open-source Modbus library written in C++. It implements client and server functions for TCP, RTU and ASCII versions of Modbus Protocol. It has interface for C language (implements in cModbus.h header file). Also it has optional wrapper to use with Qt (implements in ModbusQt.h header file). Library can work in both blocking and non-blocking mode.

Library implements such Modbus functions as:

- 1 (0x01) - `READ_COILS`
- 2 (0x02) - `READ_DISCRETE_INPUTS`
- 3 (0x03) - `READ_HOLDING_REGISTERS`
- 4 (0x04) - `READ_INPUT_REGISTERS`
- 5 (0x05) - `WRITE_SINGLE_COIL`
- 6 (0x06) - `WRITE_SINGLE_REGISTER`
- 7 (0x07) - `READ_EXCEPTION_STATUS`
- 15 (0x0F) - `WRITE_MULTIPLE_COILS`
- 16 (0x10) - `WRITE_MULTIPLE_REGISTERS`

1.0.2 Using Library

1.0.2.1 Common usage (C++)

Library was written in C++ and it is the main language to use it. To start using this library you must include `ModbusClientPort.h` (`ModbusClient.h`) or `ModbusServerPort.h` header files (of course after add include path to the compiler). This header directly or indirectly include `Modbus.h` main header file. `Modbus.h` header file contains declarations of main data types, functions and class interfaces to work with the library.

It contains definition of `Modbus::StatusCode` enumeration that defines result of library operations, `ModbusInterface` class interface that contains list of functions which the library implements, `Modbus::createClientPort` and `Modbus::createServerPort` functions, that creates corresponding `ModbusClientPort` and `ModbusServerPort` main working classes. Those classes that implements Modbus functions for the library for client and server version of protocol, respectively.

Client

`ModbusClientPort` implements Modbus interface directly and can be used very simply:

```
#include <ModbusClientPort.h>
//...
void main()
{
    Modbus::TcpSettings settings;
    settings.host = "someadr.plc";
    settings.port = 502;
    settings.timeout = 3000;
    ModbusClientPort *port = Modbus::createClientPort(Modbus::TCP, &settings, true);
    const uint8_t unit = 1;
    const uint16_t offset = 0;
    const uint16_t count = 10;
    uint16_t values[count];
    Modbus::StatusCode status = port->readHoldingRegisters(unit, offset, count, values);
    if (Modbus::StatusIsGood(status))
    {
        // process out array `values` ...
    }
    else
        std::cout << "Error: " << port->lastErrorText() << '\n';
    delete port;
}
//...
```

User don't need to create any connection or open any port, library makes it automatically.

User can use `ModbusClient` class to simplify Modbus function's interface (don't need to use `unit` parameter):

```
#include <ModbusClientPort.h>
//...
void main()
{
    //...
    ModbusClient c1(1, port);
    ModbusClient c2(2, port);
    ModbusClient c3(3, port);
    Modbus::StatusCode s1, s2, s3;
    while(1)
    {
        s1 = c1.readHoldingRegisters(0, 10, values);
        s2 = c2.readHoldingRegisters(0, 10, values);
        s3 = c3.readHoldingRegisters(0, 10, values);
        Modbus::msleep(1);
    }
    //...
}
//...
```

In this example 3 clients with unit address 1, 2, 3 are used. User don't need to manage its common resource `port`. Library make it automatically. First `c1` client owns `port`, than when finished resource transferred to `c2` and so on.

Server

Unlike client the server do not implement `ModbusInterface` directly. It accepts pointer to `ModbusInterface` in its constructor as parameter and transfer all requests to this interface. So user can define by itself how incoming Modbus-request will be processed:

```
#include <ModbusServerPort.h>
//...
class MyModbusDevice : public ModbusInterface
{
#define MEM_SIZE 16
    uint16_t mem4x[MEM_SIZE];
public:
    MyModbusDevice() { memset(mem4x, 0, sizeof(mem4x)); }
    uint16_t getValue(uint16_t offset) { return mem4x[offset]; }
    void setValue(uint16_t offset, uint16_t value) { mem4x[offset] = value; }
    Modbus::StatusCode readHoldingRegisters(uint8_t  unit,
                                            uint16_t offset,
                                            uint16_t count,
                                            uint16_t *values) override
    {
        if (unit != 1)
            return Modbus::Status_BadGatewayPathUnavailable;
        if ((offset + count) <= MEM_SIZE)
```

```
        {
            memcpy(values, mem4x, count*sizeof(uint16_t));
            return Modbus::Status_Good;
        }
        return Modbus::Status_BadIllegalDataAddress;
    }
};

void main()
{
    MyModbusDevice device;
    Modbus::TcpSettings settings;
    settings.port = 502;
    settings.timeout = 3000;
    ModbusServerPort *port = Modbus::createServerPort(&device, Modbus::TCP, &settings, false);
    int c = 0;
    while (1)
    {
        port->process();
        Modbus::msleep(1);
        if (c % 1000 == 0) setValue(0, getValue(0)+1);
    }
}
//...
```

In this example `MyModbusDevice` ModbusInterface class was created. It imlements only single function: read↩ HoldingRegisters (0x03). All other functions will return `Modbus::Status_BadIllegalFunction` by default.

This example creates Modbus TCP server that process connections and increment first 4x register by 1 every second. This example uses non blocking mode.

Non blocking mode

In non blocking mode Modbus function exits immediately even if remote connection processing is not finished. In this case function returns `Modbus::Status_Processing`. This is 'Arduino'-style of programing, when function must not be blocked and return intermediate value that indicates that function is not finished. Then external code call this function again and again until Good or Bad status will not be returned.

Example of non blocking client:

```
#include <ModbusClientPort.h>
//...
void main()
{
    //...
    ModbusClientPort *port = Modbus::createClientPort(Modbus::TCP, &settings, false);
    //...
    while(1)
    {
        s1 = c1.readHoldingRegisters(0, 10, values);
        s2 = c2.readHoldingRegisters(0, 10, values);
        s3 = c3.readHoldingRegisters(0, 10, values);
        doSomeOtherStuffInCurrentThread();
        Modbus::msleep(1);
    }
    //...
}
//...
```

So if user needs to check is function finished he can write:

```
//...
s1 = c1.readHoldingRegisters(0, 10, values);
if (!Modbus::StatusIsProcessing(s1)) {
    // ...
}
//...
```

Signal/slot mechanism

Library has simplified Qt-like signal/slot mechanism that can use callbacks when some signal is occured. User can connect function(s) or class method(s) to the predefined signal. Callbacks will be called in order which it were connected.

For example ModbusClientPort signal/slot mechanism:

```
#include <ModbusClientPort.h>

class Printable
{
public:
    void printTx(const Modbus::Char *source, const uint8_t* buff, uint16_t size)
    {
        std::cout « source « " Tx: " « Modbus::bytesToString(buff, size) « '\n';
    }
};

void printRx(const Modbus::Char *source, const uint8_t* buff, uint16_t size)
{
    std::cout « source « " Rx: " « Modbus::bytesToString(buff, size) « '\n';
}

void main()
{
    //...
    ModbusClientPort *port = Modbus::createClientPort(Modbus::TCP, &settings, false);
    Printable print;
    port->connect(&ModbusClientPort::signalTx, &print, &Printable::printTx);
    port->connect(&ModbusClientPort::signalRx, printRx);
    //...
}
```

1.0.2.2 Using with C

To use the library with pure C language user needs to include only one header: cModbus.h. This header includes functions that wraps Modbus interface classes and its methods.

```
#include <cModbus.h>
//...
void printTx(const Char *source, const uint8_t* buff, uint16_t size)
{
    Char s[1000];
    printf("%s Tx: %s\n", source, sbytes(buff, size, s, sizeof(s)));
}

void printRx(const Char *source, const uint8_t* buff, uint16_t size)
{
    Char s[1000];
    printf("%s Rx: %s\n", source, sbytes(buff, size, s, sizeof(s)));
}

void main()
{
    TcpSettings settings;
    settings.host = "someadr.plc";
    settings.port = 502;
    settings.timeout = 3000;
    const uint8_t unit = 1;
    cModbusClient client = cCliCreate(unit, TCP, &settings, true);
    cModbusClientPort cpo = cCliGetPort(client);
    StatusCode s;
    cCpoConnectTx(cpo, printTx);
    cCpoConnectRx(cpo, printRx);
    while(1)
    {
        s = cReadHoldingRegisters(client, 0, 10, values);
        //...
        msleep(1);
    }
}
//...
```

1.0.2.3 Using with Qt

When including ModbusQt.h user can use ModbusLib in convinient way in Qt framework. It has wrapper functions for Qt library to use it together with Qt core objects:

```
#include <ModbusQt.h>
```

1.0.3 Examples

Examples is located in examples folder or root directory.

1.0.3.1 democlient

democlient example demonstrate all implemented functions for client one by one begining from function with lowest number and then increasing this number with predefined period and other parameters. To see list of available parameters you can print next commands:

```
$ ./democlient -?
$ ./democlient -help
```

1.0.3.2 mbclient

mbclient is a simple example that can work like command-line Modbus Client Tester. It can use only single function at a time but user can change parameters of every supported function. To see list of available parameters you can print next commands:

```
$ ./mbclient -?
$ ./mbclient -help
```

Usage example:

```
$ ./mbclient -func 3 -offset 0 -count 10 -period 500 -n inf
```

1.0.3.3 demoserver

democlient example demonstrate all implemented functions for server. It uses single block for every type of Modbus memory (0x, 1x, 3x and 4x) and emulates value change for the first 16 bit register by inceremting it by 1 every 1000 milliseconds. So user can run Modbus Client to check first 16 bit of 000001 (100001) or first register 400001 (300001) changing every 1 second. To see list of available parameters you can print next commands:

```
$ ./demoserver -?
$ ./demoserver -help
```

1.0.3.4 mbserver

mbserver is a simple example that can work like command-line Modbus Server Tester. It implements all function of Modbus library. So remote client can work with server reading and writting values to it. To see list of available parameters you can print next commands:

```
$ ./mbserver -?
$ ./mbserver -help
```

Usage example:

```
$ ./mbserver -c0 256 -c1 256 -c3 16 -c4 16 -type RTU -serial /dev/ttyS0
```

1.0.4 Tests

Unit Tests using googletest library. Googletest source library must be located in external/googletest

1.0.5 Documenations

Documentation is located in docs directory. Documentation is automatically generated by doxygen.

1.0.6 Building

1.0.6.1 Build using CMake

1. Build Tools

   Previously you need to install c++ compiler kit, git and cmake itself (qt tools if needed).

   Then set PATH env variable to find compliler, cmake, git etc.

   Don't forget to use appropriate version of compiler, linker (x86|x64).

2. Create project directory, move to it and clone repository:
```
$ cd ~
$ mkdir src
$ cd src
$ git clone https://github.com/serhmarch/ModbusLib.git
```

3. Create and/or move to directory for build output, e.g. `~/bin/ModbusLib`:
```
$ cd ~
$ mkdir -p bin/ModbusLib
$ cd bin/ModbusLib
```

4. Run cmake to generate project (make) files.
```
$ cmake -S ~/src/ModbusLib -B .
```

   To make Qt-compatibility (switch off by default for cmake build) you can use next command (e.g. for Windows 64):
```
>cmake -DMB_QT_ENABLED=ON -DCMAKE_PREFIX_PATH:PATH=C:/Qt/5.15.2/msvc2019_64 -S <path\to\src\ModbusLib>
-B .
```

5. Make binaries (+ debug|release config):
```
$ cmake --build .
$ cmake --build . --config Debug
$ cmake --build . --config Release
```

6. Resulting bin files is located in `./bin` directory.

1.0.6.2 Build using qmake

1. Update package list:
```
$ sudo apt-get update
```

2. Install main build tools like g++, make etc:
```
$ sudo apt-get install build-essential
```

3. Install Qt tools:
```
$ sudo apt-get install qtbase5-dev qttools5-dev
```

4. Check for correct instalation:
```
$ whereis qmake
qmake: /usr/bin/qmake
$ whereis libQt5Core*
libQt5Core.prl: /usr/lib/x86_64-linux-gnu/libQt5Core.prl
libQt5Core.so: /usr/lib/x86_64-linux-gnu/libQt5Core.so
libQt5Core.so.5: /usr/lib/x86_64-linux-gnu/libQt5Core.so.5
libQt5Core.so.5.15: /usr/lib/x86_64-linux-gnu/libQt5Core.so.5.15
libQt5Core.so.5.15.3: /usr/lib/x86_64-linux-gnu/libQt5Core.so.5.15.3
$ whereis libQt5Help*
libQt5Help.prl: /usr/lib/x86_64-linux-gnu/libQt5Help.prl
libQt5Help.so: /usr/lib/x86_64-linux-gnu/libQt5Help.so
libQt5Help.so.5: /usr/lib/x86_64-linux-gnu/libQt5Help.so.5
libQt5Help.so.5.15: /usr/lib/x86_64-linux-gnu/libQt5Help.so.5.15
libQt5Help.so.5.15.3: /usr/lib/x86_64-linux-gnu/libQt5Help.so.5.15.3
```

5. Install git:
```
$ sudo apt-get install git
```

6. Create project directory, move to it and clone repository:
```
$ cd ~
$ mkdir src
$ cd src
$ git clone https://github.com/serhmarch/ModbusLib.git
```

7. Create and/or move to directory for build output, e.g. ~/bin/ModbusLib:
```
$ cd ~
$ mkdir -p bin/ModbusLib
$ cd bin/ModbusLib
```

8. Run qmake to create Makefile for build:
```
$ qmake ~/src/ModbusLib/src/ModbusLib.pro -spec linux-g++
```

9. To ensure Makefile was created print:
```
$ ls -l
total 36
-rw-r--r-- 1 march march 35001 May  6 18:41 Makefile
```

10. Finaly to make current set of programs print:
```
$ make
```

11. After build step move to <build_folder>/bin to ensure everything is correct:
```
$ cd bin
$ pwd
~/bin/ModbusLib/bin
```

Chapter 2

Namespace Index

2.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

Chapter 3

Hierarchical Index

3.1 Class Hierarchy

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

Chapter 4

Class Index

4.1 Class List

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

Chapter 5

File Index

5.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 6

Namespace Documentation

6.1 Modbus Namespace Reference

Main Modbus namespace. Contains classes, functions and constants to work with Modbus-protocol.

Classes

- class Address

  Class for convinient manipulation with Modbus Data Address.
- class Defaults

  Holds the default values of the settings.
- struct SerialSettings

  Struct to define settings for Serial Port.
- class Strings

  Sets constant key values for the map of settings.
- struct TcpSettings

  Struct to define settings for TCP connection.

Typedefs

- typedef std::string **String**

  Modbus::String class for strings.
- template<class T >
  using **List** = std::list<T>

  Modbus::List template class.
- typedef void * **Handle**

  Handle type for native OS values.
- typedef char **Char**

  Type for Modbus character.
- typedef uint32_t **Timer**

  Type for Modbus timer.
- typedef enum Modbus::_MemoryType **MemoryType**

  Defines type of memory used in Modbus protocol.
- typedef QHash< QString, QVariant > **Settings**

  Map for settings of Modbus protocol where key has type `QString` and value is `QVariant`.

Enumerations

- enum Constants { VALID_MODBUS_ADDRESS_BEGIN = 1 , VALID_MODBUS_ADDRESS_END = 247 , STANDARD_TCP_PORT = 502 }

  Define list of contants of Modbus protocol.
- enum _MemoryType {
  Memory_Unknown = 0xFFFF , Memory_0x = 0 , Memory_Coils = Memory_0x , Memory_1x = 1 ,
  Memory_DiscreteInputs = Memory_1x , Memory_3x = 3 , Memory_InputRegisters = Memory_3x ,
  Memory_4x = 4 ,
  Memory_HoldingRegisters = Memory_4x }

  Defines type of memory used in Modbus protocol.
- enum StatusCode {
  Status_Processing = 0x80000000 , Status_Good = 0x00000000 , Status_Bad = 0x01000000 ,
  Status_Uncertain = 0x02000000 ,
  Status_BadIllegalFunction = Status_Bad | 0x01 , Status_BadIllegalDataAddress = Status_Bad | 0x02 ,
  Status_BadIllegalDataValue = Status_Bad | 0x03 , Status_BadServerDeviceFailure = Status_Bad | 0x04 ,
  Status_BadAcknowledge = Status_Bad | 0x05 , Status_BadServerDeviceBusy = Status_Bad | 0x06 ,
  Status_BadNegativeAcknowledge = Status_Bad | 0x07 , Status_BadMemoryParityError = Status_Bad | 0x08
  ,
  Status_BadGatewayPathUnavailable = Status_Bad | 0x0A , Status_BadGatewayTargetDeviceFailedToRespond
  = Status_Bad | 0x0B , Status_BadEmptyResponse = Status_Bad | 0x101 , Status_BadNotCorrectRequest ,
  Status_BadNotCorrectResponse , Status_BadWriteBufferOverflow , Status_BadReadBufferOverflow ,
  Status_BadSerialOpen = Status_Bad | 0x201 ,
  Status_BadSerialWrite , Status_BadSerialRead , Status_BadAscMissColon = Status_Bad | 0x301 ,
  Status_BadAscMissCrLf ,
  Status_BadAscChar , Status_BadLrc , Status_BadCrc = Status_Bad | 0x401 , Status_BadTcpCreate =
  Status_Bad | 0x501 ,
  Status_BadTcpConnect , Status_BadTcpWrite , Status_BadTcpRead , Status_BadTcpBind ,
  Status_BadTcpListen , Status_BadTcpAccept , Status_BadTcpDisconnect }

  Defines status of executed Modbus functions.
- enum ProtocolType { ASC , RTU , TCP }

  Defines type of Modbus protocol.
- enum Parity {
  NoParity , EvenParity , OddParity , SpaceParity ,
  MarkParity }

  Defines Parity for serial port.
- enum StopBits { OneStop , OneAndHalfStop , TwoStop }

  Defines Stop Bits for serial port.
- enum FlowControl { NoFlowControl , HardwareControl , SoftwareControl }

  FlowControl Parity for serial port.

Functions

- String toModbusString (int val)
- MODBUS_EXPORT String bytesToString (const uint8_t *buff, uint32_t count)
- MODBUS_EXPORT String asciiToString (const uint8_t *buff, uint32_t count)
- MODBUS_EXPORT List< String > availableSerialPorts ()
- MODBUS_EXPORT ModbusPort * createPort (ProtocolType type, const void *settings, bool blocking)
- MODBUS_EXPORT ModbusClientPort * createClientPort (ProtocolType type, const void *settings, bool blocking)
- MODBUS_EXPORT ModbusServerPort * createServerPort (ModbusInterface *device, ProtocolType type, const void *settings, bool blocking)
- bool StatusIsProcessing (StatusCode status)
- bool StatusIsGood (StatusCode status)

- bool StatusIsBad (StatusCode status)
- bool StatusIsUncertain (StatusCode status)
- bool StatusIsStandardError (StatusCode status)
- bool getBit (const void *bitBuff, uint16_t bitNum)
- bool getBitS (const void *bitBuff, uint16_t bitNum, uint16_t maxBitCount)
- void setBit (void *bitBuff, uint16_t bitNum, bool value)
- void setBitS (void *bitBuff, uint16_t bitNum, bool value, uint16_t maxBitCount)
- bool * getBits (const void *bitBuff, uint16_t bitNum, uint16_t bitCount, bool *boolBuff)
- bool * getBitsS (const void *bitBuff, uint16_t bitNum, uint16_t bitCount, bool *boolBuff, uint16_t maxBitCount)
- void * setBits (void *bitBuff, uint16_t bitNum, uint16_t bitCount, const bool *boolBuff)
- void * setBitsS (void *bitBuff, uint16_t bitNum, uint16_t bitCount, const bool *boolBuff, uint16_t maxBitCount)
- MODBUS_EXPORT uint16_t crc16 (const uint8_t *byteArr, uint32_t count)
- MODBUS_EXPORT uint8_t lrc (const uint8_t *byteArr, uint32_t count)
- MODBUS_EXPORT StatusCode readMemRegs (uint32_t offset, uint32_t count, void *values, const void *memBuff, uint32_t memRegCount)
- MODBUS_EXPORT StatusCode writeMemRegs (uint32_t offset, uint32_t count, const void *values, void *memBuff, uint32_t memRegCount)
- MODBUS_EXPORT StatusCode readMemBits (uint32_t offset, uint32_t count, void *values, const void *memBuff, uint32_t memBitCount)
- MODBUS_EXPORT StatusCode writeMemBits (uint32_t offset, uint32_t count, const void *values, void *memBuff, uint32_t memBitCount)
- MODBUS_EXPORT uint32_t bytesToAscii (const uint8_t *bytesBuff, uint8_t *asciiBuff, uint32_t count)
- MODBUS_EXPORT uint32_t asciiToBytes (const uint8_t *asciiBuff, uint8_t *bytesBuff, uint32_t count)
- MODBUS_EXPORT Char * sbytes (const uint8_t *buff, uint32_t count, Char *str, uint32_t strmaxlen)
- MODBUS_EXPORT Char * sascii (const uint8_t *buff, uint32_t count, Char *str, uint32_t strmaxlen)
- MODBUS_EXPORT Timer timer ()
- MODBUS_EXPORT void msleep (uint32_t msec)
- Address addressFromString (const QString &s)
- template<class EnumType >
  QString enumKey (int value)
- template<class EnumType >
  QString enumKey (EnumType value, const QString &byDef=QString())
- template<class EnumType >
  EnumType enumValue (const QString &key, bool *ok=nullptr)
- template<class EnumType >
  EnumType enumValue (const QVariant &value, bool *ok)
- template<class EnumType >
  EnumType enumValue (const QVariant &value, EnumType defaultValue)
- template<class EnumType >
  EnumType enumValue (const QVariant &value)
- MODBUS_EXPORT ProtocolType toProtocolType (const QString &s, bool *ok=nullptr)
- MODBUS_EXPORT ProtocolType toProtocolType (const QVariant &v, bool *ok=nullptr)
- MODBUS_EXPORT Parity toParity (const QString &s, bool *ok=nullptr)
- MODBUS_EXPORT Parity toParity (const QVariant &v, bool *ok=nullptr)
- MODBUS_EXPORT StopBits toStopBits (const QString &s, bool *ok=nullptr)
- MODBUS_EXPORT StopBits toStopBits (const QVariant &v, bool *ok=nullptr)
- MODBUS_EXPORT FlowControl toFlowControl (const QString &s, bool *ok=nullptr)
- MODBUS_EXPORT FlowControl toFlowControl (const QVariant &v, bool *ok=nullptr)
- MODBUS_EXPORT QString toString (StatusCode v)
- MODBUS_EXPORT QString toString (ProtocolType v)
- MODBUS_EXPORT QString toString (Parity v)
- MODBUS_EXPORT QString toString (StopBits v)
- MODBUS_EXPORT QString toString (FlowControl v)
- MODBUS_EXPORT QStringList availableSerialPortList ()
- MODBUS_EXPORT ModbusPort * createPort (const Settings &settings, bool blocking=false)
- MODBUS_EXPORT ModbusClientPort * createClientPort (const Settings &settings, bool blocking=false)
- MODBUS_EXPORT ModbusServerPort * createServerPort (ModbusInterface *device, const Settings &settings, bool blocking=false)

6.1.1 Detailed Description

Main Modbus namespace. Contains classes, functions and constants to work with Modbus-protocol.

6.1.2 Enumeration Type Documentation

6.1.2.1 _MemoryType

`enum Modbus::_MemoryType`

Defines type of memory used in Modbus protocol.

Enumerator

Memory_Unknown	Invalid memory type.
Memory_0x	Memory allocated for coils/discrete outputs.
Memory_Coils	Same as `Memory_0x`.
Memory_1x	Memory allocated for discrete inputs.
Memory_DiscreteInputs	Same as `Memory_1x`.
Memory_3x	Memory allocated for analog inputs.
Memory_InputRegisters	Same as `Memory_3x`.
Memory_4x	Memory allocated for holding registers/analog outputs.
Memory_HoldingRegisters	Same as `Memory_4x`.

6.1.2.2 Constants

`enum Modbus::Constants`

Define list of contants of Modbus protocol.

Enumerator

VALID_MODBUS_ADDRESS_BEGIN	Start of Modbus device address range according to specification.
VALID_MODBUS_ADDRESS_END	End of the Modbus protocol device address range according to the specification.
STANDARD_TCP_PORT	Standard TCP port of the Modbus protocol.

6.1.2.3 FlowControl

`enum Modbus::FlowControl`

FlowControl Parity for serial port.

Enumerator

NoFlowControl	No flow control.
HardwareControl	Hardware flow control (RTS/CTS).
SoftwareControl	Software flow control (XON/XOFF).

6.1.2.4 Parity

`enum Modbus::Parity`

Defines Parity for serial port.

Enumerator

NoParity	No parity bit it sent. This is the most common parity setting.
EvenParity	The number of 1 bits in each character, including the parity bit, is always even.
OddParity	The number of 1 bits in each character, including the parity bit, is always odd. It ensures that at least one state transition occurs in each character.
SpaceParity	Space parity. The parity bit is sent in the space signal condition. It does not provide error detection information.
MarkParity	Mark parity. The parity bit is always set to the mark signal condition (logical 1). It does not provide error detection information.

6.1.2.5 ProtocolType

`enum Modbus::ProtocolType`

Defines type of Modbus protocol.

Enumerator

ASC	ASCII version of Modbus communication protocol.
RTU	RTU version of Modbus communication protocol.
TCP	TCP version of Modbus communication protocol.

6.1.2.6 StatusCode

`enum Modbus::StatusCode`

Defines status of executed Modbus functions.

Enumerator

Status_Processing	The operation is not complete. Further operation is required.
Status_Good	Successful result.
Status_Bad	Error. General.
Status_Uncertain	The status is undefined.
Status_BadIllegalFunction	Standard error. The feature is not supported.
Status_BadIllegalDataAddress	Standard error. Invalid data address.
Status_BadIllegalDataValue	Standard error. Invalid data value.
Status_BadServerDeviceFailure	Standard error. Failure during a specified operation.
Status_BadAcknowledge	Standard error. The server has accepted the request and is processing it, but it will take a long time.

Enumerator

Status_BadServerDeviceBusy	Standard error. The server is busy processing a long command. The request must be repeated later.
Status_BadNegativeAcknowledge	Standard error. The programming function cannot be performed.
Status_BadMemoryParityError	Standard error. The server attempted to read a record file but detected a parity error in memory.
Status_BadGatewayPathUnavailable	Standard error. Indicates that the gateway was unable to allocate an internal communication path from the input port o the output port for processing the request. Usually means that the gateway is misconfigured or overloaded.
Status_BadGatewayTargetDeviceFailedToRespond	Standard error. Indicates that no response was obtained from the target device. Usually means that the device is not present on the network.
Status_BadEmptyResponse	Error. Empty request/response body.
Status_BadNotCorrectRequest	Error. Invalid request.
Status_BadNotCorrectResponse	Error. Invalid response.
Status_BadWriteBufferOverflow	Error. Write buffer overflow.
Status_BadReadBufferOverflow	Error. Request receive buffer overflow.
Status_BadSerialOpen	Error. Serial port cannot be opened.
Status_BadSerialWrite	Error. Cannot send a parcel to the serial port.
Status_BadSerialRead	Error. Reading the serial port (timeout)
Status_BadAscMissColon	Error (ASC). Missing packet start character ':'.
Status_BadAscMissCrLf	Error (ASC). '\r\n' end of packet character missing.
Status_BadAscChar	Error (ASC). Invalid ASCII character.
Status_BadLrc	Error (ASC). Invalid checksum.
Status_BadCrc	Error (RTU). Wrong checksum.
Status_BadTcpCreate	Error. Unable to create a TCP socket.
Status_BadTcpConnect	Error. Unable to create a TCP connection.
Status_BadTcpWrite	Error. Unable to send a TCP packet.
Status_BadTcpRead	Error. Unable to receive a TCP packet.
Status_BadTcpBind	Error. Unable to bind a TCP socket (server side)
Status_BadTcpListen	Error. Unable to listen a TCP socket (server side)
Status_BadTcpAccept	Error. Unable accept bind a TCP socket (server side)
Status_BadTcpDisconnect	Error. Bad disconnection result.

6.1.2.7 StopBits

`enum Modbus::StopBits`

Defines Stop Bits for serial port.

Enumerator

OneStop	1 stop bit.
OneAndHalfStop	1.5 stop bit.
TwoStop	2 stop bits.

6.1.3 Function Documentation

6.1.3.1 addressFromString()

```
Address Modbus::addressFromString (
            const QString & s )  [inline]
```

Convert String repr to Modbus::Address

6.1.3.2 asciiToBytes()

```
MODBUS_EXPORT uint32_t Modbus::asciiToBytes (
            const uint8_t * asciiBuff,
            uint8_t * bytesBuff,
            uint32_t count )
```

Function converts ASCII repr `asciiBuff` to binary byte array. Every byte of output `bytesBuff` are repr as two bytes in `asciiBuff`, where most signified tetrabits represented as leading byte in hex digit in ASCII encoding (upper) and less signified tetrabits represented as tailing byte in hex digit in ASCII encoding (upper). `count` is a size of input array `asciiBuff`.

Note

Output array `bytesBuff` must be at least twice smaller than input array `asciiBuff`.

Returns

Returns size of `bytesBuff` in bytes which calc as `{output` = count / 2}

6.1.3.3 asciiToString()

```
MODBUS_EXPORT String Modbus::asciiToString (
            const uint8_t * buff,
            uint32_t count )
```

Make string representation of ASCII array and separate bytes by space

6.1.3.4 availableSerialPortList()

```
MODBUS_EXPORT QStringList Modbus::availableSerialPortList ( )
```

Returns list of string that represent names of serial ports

6.1.3.5 availableSerialPorts()

```
MODBUS_EXPORT List< String > Modbus::availableSerialPorts ( )
```

Return list of names of available serial ports

6.1.3.6 bytesToAscii()

```
MODBUS_EXPORT uint32_t Modbus::bytesToAscii (
            const uint8_t * bytesBuff,
            uint8_t * asciiBuff,
            uint32_t count )
```

Function converts byte array `bytesBuff` to ASCII repr of byte array. Every byte of `bytesBuff` are repr as two bytes in `asciiBuff`, where most signified tetrabits represented as leading byte in hex digit in ASCII encoding (upper) and less signified tetrabits represented as tailing byte in hex digit in ASCII encoding (upper). `count` is count bytes of `bytesBuff`.

Note

Output array `asciiBuff` must be at least twice bigger than input array `bytesBuff`.

Returns

Returns size of `asciiBuff` in bytes which calc as {`output` = count * 2}

6.1.3.7 bytesToString()

```
MODBUS_EXPORT String Modbus::bytesToString (
            const uint8_t * buff,
            uint32_t count )
```

Make string representation of bytes array and separate bytes by space

6.1.3.8 crc16()

```
MODBUS_EXPORT uint16_t Modbus::crc16 (
            const uint8_t * byteArr,
            uint32_t count )
```

CRC16 checksum hash function (for Modbus RTU).

Returns

Returns a 16-bit unsigned integer value of the checksum

6.1.3.9 createClientPort() [1/2]

```
MODBUS_EXPORT ModbusClientPort * Modbus::createClientPort (
            const Settings & settings,
            bool blocking = false )
```

Same as `Modbus::createClientPort(ProtocolType type, const void *settings, bool blocking)` but `ProtocolType type` and `const void *settings` are defined by `Modbus::Settings` key-value map.

6.1.3.10 createClientPort() [2/2]

```
MODBUS_EXPORT ModbusClientPort * Modbus::createClientPort (
            ProtocolType type,
            const void * settings,
            bool blocking )
```

Function for creation `ModbusClientPort` with defined parameters:

Parameters

in	*type*	Protocol type: TCP, RTU, ASC.
in	*settings*	For TCP must be pointer: `TcpSettings*`, `SerialSettings*` otherwise.
in	*blocking*	If true blocking will be set, non blocking otherwise.

6.1.3.11 createPort() [1/2]

```
MODBUS_EXPORT ModbusPort * Modbus::createPort (
            const Settings & settings,
            bool blocking = false )
```

Same as `Modbus::createPort(ProtocolType type, const void *settings, bool blocking)` but `ProtocolType type` and `const void *settings` are defined by `Modbus::Settings` key-value map.

6.1.3.12 createPort() [2/2]

```
MODBUS_EXPORT ModbusPort * Modbus::createPort (
            ProtocolType type,
            const void * settings,
            bool blocking )
```

Function for creation `ModbusPort` with defined parameters:

Parameters

in	*type*	Protocol type: TCP, RTU, ASC.
in	*settings*	For TCP must be pointer: `TcpSettings*`, `SerialSettings*` otherwise.
in	*blocking*	If true blocking will be set, non blocking otherwise.

6.1.3.13 createServerPort() [1/2]

```
MODBUS_EXPORT ModbusServerPort * Modbus::createServerPort (
            ModbusInterface * device,
            const Settings & settings,
            bool blocking = false )
```

Same as `Modbus::createServerPort(ProtocolType type, const void *settings, bool blocking)` but `ProtocolType type` and `const void *settings` are defined by `Modbus::Settings` key-value map.

6.1.3.14 createServerPort() [2/2]

```
MODBUS_EXPORT ModbusServerPort * Modbus::createServerPort (
            ModbusInterface * device,
            ProtocolType type,
```

```
const void * settings,
bool blocking )
```

Function for creation ModbusServerPort with defined parameters:

Parameters

in	*device*	Pointer to the `ModbusInterface` implementation to which all requests for Modbus functions are forwarded.
in	*type*	Protocol type: TCP, RTU, ASC.
in	*settings*	For TCP must be pointer: `TcpSettings*`, `SerialSettings*` otherwise.
in	*blocking*	If true blocking will be set, non blocking otherwise.

6.1.3.15 enumKey() [1/2]

```
template<class EnumType >
QString Modbus::enumKey (
            EnumType value,
            const QString & byDef = QString() )  [inline]
```

Convert value to QString key for type

6.1.3.16 enumKey() [2/2]

```
template<class EnumType >
QString Modbus::enumKey (
            int value )  [inline]
```

Convert value to QString key for type

6.1.3.17 enumValue() [1/4]

```
template<class EnumType >
EnumType Modbus::enumValue (
            const QString & key,
            bool * ok = nullptr )  [inline]
```

Convert key to value for enumeration by QString key

6.1.3.18 enumValue() [2/4]

```
template<class EnumType >
EnumType Modbus::enumValue (
            const QVariant & value )  [inline]
```

Convert `QVariant` value to enumeration value (int - value, string - key).

6.1.3.19 enumValue() [3/4]

```
template<class EnumType >
EnumType Modbus::enumValue (
            const QVariant & value,
            bool * ok )  [inline]
```

Convert `QVariant` value to enumeration value (int - value, string - key). Stores result of convertion in output parameter `ok`

6.1.3.20 enumValue() [4/4]

```
template<class EnumType >
EnumType Modbus::enumValue (
            const QVariant & value,
            EnumType defaultValue )  [inline]
```

Convert `QVariant` value to enumeration value (int - value, string - key). If `value` can't be converted, `default↩ Value` is returned.

6.1.3.21 getBit()

```
bool Modbus::getBit (
            const void * bitBuff,
            uint16_t bitNum )  [inline]
```

Returns the value of the bit with number 'bitNum' from the bit array 'bitBuff'.

6.1.3.22 getBits()

```
bool * Modbus::getBits (
            const void * bitBuff,
            uint16_t bitNum,
            uint16_t bitCount,
            bool * boolBuff )  [inline]
```

Gets the values of bits with number `bitNum` and count `bitCount` from the bit array `bitBuff` and stores their values in the boolean array `boolBuff`, where the value of each bit is stored as a separate `bool` value.

Returns

A pointer to the `boolBuff` array.

6.1.3.23 getBitS()

```
bool Modbus::getBitS (
            const void * bitBuff,
            uint16_t bitNum,
            uint16_t maxBitCount )  [inline]
```

Returns the value of the bit with the number 'bitNum' from the bit array 'bitBuff', if the bit number is greater than or equal to 'maxBitCount', then 'false' is returned.

6.1.3.24 getBitsS()

```
bool * Modbus::getBitsS (
            const void * bitBuff,
            uint16_t bitNum,
            uint16_t bitCount,
            bool * boolBuff,
            uint16_t maxBitCount )  [inline]
```

Similar to the `Modbus::getBits(const void*,uint16_t,uint16_t,bool*)` function, but it is controlled that the size does not exceed the maximum number of bits `maxBitCount`.

Returns

A pointer to the `boolBuff` array.

6.1.3.25 lrc()

```
MODBUS_EXPORT uint8_t Modbus::lrc (
            const uint8_t * byteArr,
            uint32_t count )
```

LRC checksum hash function (for Modbus ASCII).

Returns

Returns an 8-bit unsigned integer value of the checksum

6.1.3.26 msleep()

```
MODBUS_EXPORT void Modbus::msleep (
            uint32_t msec )
```

Make current thread sleep with 'msec' milliseconds.

6.1.3.27 readMemBits()

```
MODBUS_EXPORT StatusCode Modbus::readMemBits (
            uint32_t offset,
            uint32_t count,
            void * values,
            const void * memBuff,
            uint32_t memBitCount )
```

Function for copy (read) values from memory input `memBuff` and put it to the output buffer `values` for discretes (bits):

Parameters

in	*offset*	Memory offset to read from `memBuff` in bit size.
in	*count*	Count of bits to read from memory `memBuff`.
out	*values*	Output buffer to store data.
in	*memBuff*	Pointer to the memory which holds data.
in	*memBitCount*	Size of memory buffer `memBuff` in bits.

6.1.3.28 readMemRegs()

```
MODBUS_EXPORT StatusCode Modbus::readMemRegs (
            uint32_t offset,
            uint32_t count,
            void * values,
            const void * memBuff,
            uint32_t memRegCount )
```

Function for copy (read) values from memory input `memBuff` and put it to the output buffer `values` for 16 bit registers:

Parameters

in	*offset*	Memory offset to read from `memBuff` in 16-bit registers size.
in	*count*	Count of 16-bit registers to read from memory `memBuff`.
out	*values*	Output buffer to store data.
in	*memBuff*	Pointer to the memory which holds data.
in	*memRegCount*	Size of memory buffer `memBuff` in 16-bit registers.

6.1.3.29 sascii()

```
MODBUS_EXPORT Char * Modbus::sascii (
            const uint8_t * buff,
            uint32_t count,
            Char * str,
            uint32_t strmaxlen )
```

Make string representation of ASCII array and separate bytes by space

6.1.3.30 sbytes()

```
MODBUS_EXPORT Char * Modbus::sbytes (
            const uint8_t * buff,
            uint32_t count,
            Char * str,
            uint32_t strmaxlen )
```

Make string representation of bytes array and separate bytes by space

6.1.3.31 setBit()

```
void Modbus::setBit (
            void * bitBuff,
            uint16_t bitNum,
            bool value )  [inline]
```

Sets the value of the bit with the number 'bitNum' to the bit array 'bitBuff'.

6.1.3.32 setBitS()

```
void Modbus::setBitS (
            void * bitBuff,
            uint16_t bitNum,
            bool value,
            uint16_t maxBitCount )  [inline]
```

Sets the value of the bit with the number 'bitNum' to the bit array 'bitBuff', controlling the size of the array 'maxBit↩ Count' in bits.

6.1.3.33 setBits()

```
void * Modbus::setBits (
            void * bitBuff,
            uint16_t bitNum,
            uint16_t bitCount,
            const bool * boolBuff )  [inline]
```

Sets the values of the bits in the `bitBuff` array starting with the number `bitNum` and the count `bitCount` from the `boolBuff` array, where the value of each bit is stored as a separate `bool` value.

Returns

A pointer to the `bitBuff` array.

6.1.3.34 setBitsS()

```
void * Modbus::setBitsS (
            void * bitBuff,
            uint16_t bitNum,
            uint16_t bitCount,
            const bool * boolBuff,
            uint16_t maxBitCount )  [inline]
```

Similar to the `Modbus::setBits(void*,uint16_t,uint16_t,const bool*)` function, but it is controlled that the size does not exceed the maximum number of bits `maxBitCount`.

Returns

A pointer to the `bitBuff` array.

6.1.3.35 StatusIsBad()

```
bool Modbus::StatusIsBad (
            StatusCode status )  [inline]
```

Returns a general indication that the operation result is unsuccessful.

6.1.3.36 StatusIsGood()

```
bool Modbus::StatusIsGood (
            StatusCode status )  [inline]
```

Returns a general indication that the operation result is successful.

6.1.3.37 StatusIsProcessing()

```
bool Modbus::StatusIsProcessing (
            StatusCode status )  [inline]
```

Returns a general indication that the result of the operation is incomplete.

6.1.3.38 StatusIsStandardError()

```
bool Modbus::StatusIsStandardError (
            StatusCode status )  [inline]
```

Returns a general sign that the result is standard error.

6.1.3.39 StatusIsUncertain()

```
bool Modbus::StatusIsUncertain (
            StatusCode status )  [inline]
```

Returns a general sign that the result of the operation is undefined.

6.1.3.40 timer()

```
MODBUS_EXPORT Timer Modbus::timer ( )
```

Get timer value in milliseconds.

6.1.3.41 toFlowControl() [1/2]

```
MODBUS_EXPORT FlowControl Modbus::toFlowControl (
            const QString & s,
            bool * ok = nullptr )
```

Converts string representation to `FlowControl` enum value. If ok is not nullptr, failure is reported by setting ∗ok to false, and success by setting ∗ok to true.

6.1.3.42 toFlowControl() [2/2]

```
MODBUS_EXPORT FlowControl Modbus::toFlowControl (
            const QVariant & v,
            bool * ok = nullptr )
```

Converts string representation to `FlowControl` enum value. If ok is not nullptr, failure is reported by setting ∗ok to false, and success by setting ∗ok to true.

6.1.3.43 toModbusString()

```
String Modbus::toModbusString (
            int val )  [inline]
```

Convert interger value to Modbus::String

Returns

Returns new Modbus::String value

6.1.3.44 toParity() [1/2]

```
MODBUS_EXPORT Parity Modbus::toParity (
            const QString & s,
            bool * ok = nullptr )
```

Converts string representation to `Parity` enum value. If ok is not nullptr, failure is reported by setting ∗ok to false, and success by setting ∗ok to true.

6.1.3.45 toParity() [2/2]

```
MODBUS_EXPORT Parity Modbus::toParity (
            const QVariant & v,
            bool * ok = nullptr )
```

Converts string representation to `Parity` enum value. If ok is not nullptr, failure is reported by setting ∗ok to false, and success by setting ∗ok to true.

6.1.3.46 toProtocolType() [1/2]

```
MODBUS_EXPORT ProtocolType Modbus::toProtocolType (
            const QString & s,
            bool * ok = nullptr )
```

Converts string representation to `ProtocolType` enum value. If ok is not nullptr, failure is reported by setting ∗ok to false, and success by setting ∗ok to true.

6.1.3.47 toProtocolType() [2/2]

```
MODBUS_EXPORT ProtocolType Modbus::toProtocolType (
            const QVariant & v,
            bool * ok = nullptr )
```

Converts string representation to `ProtocolType` enum value. If ok is not nullptr, failure is reported by setting ∗ok to false, and success by setting ∗ok to true.

6.1.3.48 toStopBits() [1/2]

```
MODBUS_EXPORT StopBits Modbus::toStopBits (
            const QString & s,
            bool * ok = nullptr )
```

Converts string representation to `StopBits` enum value. If ok is not nullptr, failure is reported by setting ∗ok to false, and success by setting ∗ok to true.

6.1.3.49 toStopBits() [2/2]

```
MODBUS_EXPORT StopBits Modbus::toStopBits (
            const QVariant & v,
            bool * ok = nullptr )
```

Converts string representation to `StopBits` enum value. If ok is not nullptr, failure is reported by setting ∗ok to false, and success by setting ∗ok to true.

6.1.3.50 toString() [1/5]

```
MODBUS_EXPORT QString Modbus::toString (
            FlowControl v )
```

Returns string representation of `FlowControl` enum value

6.1.3.51 toString() [2/5]

```
MODBUS_EXPORT QString Modbus::toString (
            Parity v )
```

Returns string representation of `Parity` enum value

6.1.3.52 toString() [3/5]

```
MODBUS_EXPORT QString Modbus::toString (
            ProtocolType v )
```

Returns string representation of `ProtocolType` enum value

6.1.3.53 toString() [4/5]

```
MODBUS_EXPORT QString Modbus::toString (
            StatusCode v )
```

Returns string representation of `StatusCode` enum value

6.1.3.54 toString() [5/5]

```
MODBUS_EXPORT QString Modbus::toString (
            StopBits v )
```

Returns string representation of `StopBits` enum value

6.1.3.55 writeMemBits()

```
MODBUS_EXPORT StatusCode Modbus::writeMemBits (
            uint32_t offset,
            uint32_t count,
            const void * values,
            void * memBuff,
            uint32_t memBitCount )
```

Function for copy (write) values from input buffer `values` to memory `memBuff` for discretes (bits):

Parameters

in	*offset*	Memory offset to write to `memBuff` in bit size.
in	*count*	Count of bits to write into memory `memBuff`.
out	*values*	Input buffer that holds data to write.
in	*memBuff*	Pointer to the memory buffer.
in	*memBitCount*	Size of memory buffer `memBuff` in bits.

6.1.3.56 writeMemRegs()

```
MODBUS_EXPORT StatusCode Modbus::writeMemRegs (
            uint32_t offset,
            uint32_t count,
            const void * values,
            void * memBuff,
            uint32_t memRegCount )
```

Function for copy (write) values from input buffer `values` to memory `memBuff` for 16 bit registers:

Parameters

in	*offset*	Memory offset to write to `memBuff` in 16-bit registers size.
in	*count*	Count of 16-bit registers to write into memory `memBuff`.
out	*values*	Input buffer that holds data to write.
in	*memBuff*	Pointer to the memory buffer.
in	*memRegCount*	Size of memory buffer `memBuff` in 16-bit registers.

Chapter 7

Class Documentation

7.1 Modbus::Address Class Reference

Class for convinient manipulation with Modbus Data Address.

`#include <ModbusQt.h>`

Public Member Functions

- Address ()
- Address (Modbus::MemoryType, quint16 offset)
- Address (quint32 adr)
- bool isValid () const
- MemoryType type () const
- quint16 offset () const
- quint32 number () const
- QString toString () const
- operator quint32 () const
- Address & operator= (quint32 v)

7.1.1 Detailed Description

Class for convinient manipulation with Modbus Data Address.

7.1.2 Constructor & Destructor Documentation

7.1.2.1 Address() [1/3]

`Modbus::Address::Address ( )`

Defauilt constructor ot the class. Creates invalid Modbus Data Address

7.1.2.2 Address() [2/3]

```
Modbus::Address::Address (
            Modbus::MemoryType ,
            quint16 offset )
```

Constructor ot the class. E.g. `Address(Modbus::Memory_4x, 0)` creates `400001` standard address.

7.1.2.3 Address() [3/3]

```
Modbus::Address::Address (
            quint32 adr )
```

Constructor ot the class. E.g. `Address(400001)` creates `Address` with type `Modbus::Memory_4x` and offset `0`, and `Address(1)` creates `Address` with type `Modbus::Memory_0x` and offset `0`.

7.1.3 Member Function Documentation

7.1.3.1 isValid()

```
bool Modbus::Address::isValid ( ) const  [inline]
```

Returns `true` if memory type is `Modbus::Memory_Unknown`, `false` otherwise

7.1.3.2 number()

```
quint32 Modbus::Address::number ( ) const  [inline]
```

Returns memory number (offset+1) of Modbus Data Address

7.1.3.3 offset()

```
quint16 Modbus::Address::offset ( ) const  [inline]
```

Returns memory offset of Modbus Data Address

7.1.3.4 operator quint32()

```
Modbus::Address::operator quint32 ( ) const  [inline]
```

Converts current Modbus Data Address to `quint32`, e.g. `Address(Modbus::Memory_4x, 0)` will be converted to `400001`.

7.1.3.5 operator=()

```
Address & Modbus::Address::operator= (
            quint32 v )
```

Assigment operator definition.

7.1.3.6 toString()

```
QString Modbus::Address::toString ( ) const
```

Returns string repr of Modbus Data Address e.g. `Address(Modbus::Memory_4x, 0)` will be converted to `QString("400001")`.

7.1.3.7 type()

```
MemoryType Modbus::Address::type ( ) const  [inline]
```

Returns memory type of Modbus Data Address

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusQt.h

7.2 Modbus::Defaults Class Reference

Holds the default values of the settings.

```
#include <ModbusQt.h>
```

Public Member Functions

- Defaults ()

Static Public Member Functions

- static const Defaults & instance ()

Public Attributes

- const uint8_t **unit**
  Default value for the unit number of remote device.
- const ProtocolType **type**
  Default value for the type of Modbus protocol.
- const QString **host**
  Default value for the IP address or DNS name of the remote device.
- const uint16_t **port**
  Default value for the TCP port number of the remote device.
- const uint32_t **timeout**
  Default value for connection timeout (milliseconds)
- const QString **serialPortName**
  Default value for the serial port name.
- const int32_t **baudRate**
  Default value for the serial port's baud rate.
- const int8_t **dataBits**
  Default value for the serial port's data bits.
- const Parity **parity**
  Default value for the serial port's patiry.
- const StopBits **stopBits**
  Default value for the serial port's stop bits.
- const FlowControl **flowControl**
  Default value for the serial port's flow control.
- const uint32_t **timeoutFirstByte**
  Default value for the serial port's timeout waiting first byte of packet.
- const uint32_t **timeoutInterByte**
  Default value for the serial port's timeout waiting next byte of packet.

7.2.1 Detailed Description

Holds the default values of the settings.

7.2.2 Constructor & Destructor Documentation

7.2.2.1 Defaults()

```
Modbus::Defaults::Defaults ( )
```

Constructor ot the class.

7.2.3 Member Function Documentation

7.2.3.1 instance()

```
static const Defaults & Modbus::Defaults::instance ( )  [static]
```

Returns a reference to the global `Modbus::Defaults` object.

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusQt.h

7.3 ModbusSerialPort::Defaults Struct Reference

Holds the default values of the settings.

`#include <ModbusSerialPort.h>`

Public Member Functions

- Defaults ()

Static Public Member Functions

- static const Defaults & instance ()

Public Attributes

- const Modbus::Char * **portName**
  Default value for the serial port name.
- const int32_t **baudRate**
  Default value for the serial port's baud rate.
- const int8_t **dataBits**
  Default value for the serial port's data bits.
- const Modbus::Parity **parity**
  Default value for the serial port's patiry.
- const Modbus::StopBits **stopBits**
  Default value for the serial port's stop bits.
- const Modbus::FlowControl **flowControl**
  Default value for the serial port's flow control.
- const uint32_t **timeoutFirstByte**
  Default value for the serial port's timeout waiting first byte of packet.
- const uint32_t **timeoutInterByte**
  Default value for the serial port's timeout waiting next byte of packet.

7.3.1 Detailed Description

Holds the default values of the settings.

7.3.2 Constructor & Destructor Documentation

7.3.2.1 Defaults()

`ModbusSerialPort::Defaults::Defaults ( )`

Constructor ot the class.

7.3.3 Member Function Documentation

7.3.3.1 instance()

```
static const Defaults & ModbusSerialPort::Defaults::instance ( )  [static]
```

Returns a reference to the global `ModbusSerialPort::Defaults` object.

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusSerialPort.h

7.4 ModbusTcpPort::Defaults Struct Reference

`Defaults` class constain default settings values for `ModbusTcpPort`.

`#include <ModbusTcpPort.h>`

Public Member Functions

- Defaults ()

Static Public Member Functions

- static const Defaults & instance ()

Public Attributes

- const Modbus::Char * **host**

  Default setting 'TCP host name (DNS or IP address)'.
- const uint16_t **port**

  Default setting 'TCP port number' for the listening server.
- const uint32_t **timeout**

  Default setting for the read timeout of every single conncetion.

7.4.1 Detailed Description

`Defaults` class constain default settings values for `ModbusTcpPort`.

7.4.2 Constructor & Destructor Documentation

7.4.2.1 Defaults()

```
ModbusTcpPort::Defaults::Defaults ( )
```

Constructor of the class.

7.4.3 Member Function Documentation

7.4.3.1 instance()

```
static const Defaults & ModbusTcpPort::Defaults::instance ( )  [static]
```

Returns a reference to the global default value object.

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusTcpPort.h

7.5 ModbusTcpServer::Defaults Struct Reference

`Defaults` class constain default settings values for `ModbusTcpServer`.

```
#include <ModbusTcpServer.h>
```

Public Member Functions

- Defaults ()

Static Public Member Functions

- static const Defaults & instance ()

Public Attributes

- const uint16_t **port**

  Default setting 'TCP port number' for the listening server.
- const uint32_t **timeout**

  Default setting for the read timeout of every single conncetion.

7.5.1 Detailed Description

`Defaults` class constain default settings values for `ModbusTcpServer`.

7.5.2 Constructor & Destructor Documentation

7.5.2.1 Defaults()

```
ModbusTcpServer::Defaults::Defaults ( )
```

Constructor of the class.

7.5.3 Member Function Documentation

7.5.3.1 instance()

```
static const Defaults & ModbusTcpServer::Defaults::instance ( )  [static]
```

Returns a reference to the global default value object.

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

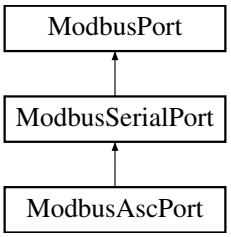
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusTcpServer.h

7.6 ModbusAscPort Class Reference

Implements ASCII version of the Modbus communication protocol.

```
#include <ModbusAscPort.h>
```

Inheritance diagram for ModbusAscPort:



Public Member Functions

- ModbusAscPort (bool blocking=false)
- ~ModbusAscPort ()
- Modbus::ProtocolType type () const override

Public Member Functions inherited from ModbusSerialPort

- Modbus::Handle handle () const override
- Modbus::StatusCode open () override
- Modbus::StatusCode close () override
- bool isOpen () const override
- const Modbus::Char * portName () const
- void setPortName (const Modbus::Char *portName)
- int32_t baudRate () const
- void setBaudRate (int32_t baudRate)
- int8_t dataBits () const
- void setDataBits (int8_t dataBits)
- Modbus::Parity parity () const
- void setParity (Modbus::Parity parity)
- Modbus::StopBits stopBits () const

- void setStopBits (Modbus::StopBits stopBits)
- Modbus::FlowControl flowControl () const
- void setFlowControl (Modbus::FlowControl flowControl)
- uint32_t timeoutFirstByte () const
- void setTimeoutFirstByte (uint32_t timeout)
- uint32_t timeoutInterByte () const
- void setTimeoutInterByte (uint32_t timeout)
- const uint8_t * readBufferData () const override
- uint16_t readBufferSize () const override
- const uint8_t * writeBufferData () const override
- uint16_t writeBufferSize () const override

Public Member Functions inherited from ModbusPort

- virtual ~ModbusPort ()
- virtual void setNextRequestRepeated (bool v)
- bool isChanged () const
- bool isServerMode () const
- virtual void setServerMode (bool mode)
- bool isBlocking () const
- bool isNonBlocking () const
- Modbus::StatusCode lastErrorStatus () const
- const Modbus::Char * lastErrorText () const

Protected Member Functions

- Modbus::StatusCode writeBuffer (uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff) override
- Modbus::StatusCode readBuffer (uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t maxSzBuff, uint16_t *szOutBuff) override

Protected Member Functions inherited from ModbusSerialPort

- Modbus::StatusCode write () override
- Modbus::StatusCode read () override

Protected Member Functions inherited from ModbusPort

- Modbus::StatusCode setError (Modbus::StatusCode status, const Modbus::Char *text)

7.6.1 Detailed Description

Implements ASCII version of the Modbus communication protocol.

`ModbusAscPort` derived from `ModbusSerialPort` and implements `writeBuffer` and `readBuffer` for ASCII version of Modbus communication protocol.

7.6.2 Constructor & Destructor Documentation

7.6.2.1 ModbusAscPort()

```
ModbusAscPort::ModbusAscPort (
            bool blocking = false )
```

Constructor of the class. if `blocking = true` then defines blocking mode, non blocking otherwise.

7.6.2.2 ~ModbusAscPort()

```
ModbusAscPort::~ModbusAscPort ( )
```

Destructor of the class.

7.6.3 Member Function Documentation

7.6.3.1 readBuffer()

```
Modbus::StatusCode ModbusAscPort::readBuffer (
            uint8_t & unit,
            uint8_t & func,
            uint8_t * buff,
            uint16_t maxSzBuff,
            uint16_t * szOutBuff )  [override], [protected], [virtual]
```

The function parses the packet that the `read()` function puts into the buffer, checks it for correctness, extracts its parameters, and returns the status of the operation.

Implements ModbusPort.

7.6.3.2 type()

```
Modbus::ProtocolType ModbusAscPort::type ( ) const  [inline], [override], [virtual]
```

Returns the Modbus protocol type. For `ModbusAscPort` returns `Modbus::ASC`.

Implements ModbusPort.

7.6.3.3 writeBuffer()

```
Modbus::StatusCode ModbusAscPort::writeBuffer (
            uint8_t unit,
            uint8_t func,
            uint8_t * buff,
            uint16_t szInBuff )  [override], [protected], [virtual]
```

The function directly generates a packet and places it in the buffer for further sending. Returns the status of the operation.

Implements ModbusPort.

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

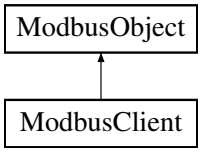
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusAscPort.h

7.7 ModbusClient Class Reference

The `ModbusClient` class implements the interface of the client part of the Modbus protocol.

`#include <ModbusClient.h>`

Inheritance diagram for ModbusClient:



Public Member Functions

- ModbusClient (uint8_t unit, ModbusClientPort *port)
- Modbus::ProtocolType type () const
- uint8_t unit () const
- void setUnit (uint8_t unit)
- bool isOpen () const
- ModbusClientPort * port () const
- Modbus::StatusCode readCoils (uint16_t offset, uint16_t count, void *values)
- Modbus::StatusCode readDiscreteInputs (uint16_t offset, uint16_t count, void *values)
- Modbus::StatusCode readHoldingRegisters (uint16_t offset, uint16_t count, uint16_t *values)
- Modbus::StatusCode readInputRegisters (uint16_t offset, uint16_t count, uint16_t *values)
- Modbus::StatusCode writeSingleCoil (uint16_t offset, bool value)
- Modbus::StatusCode writeSingleRegister (uint16_t offset, uint16_t value)
- Modbus::StatusCode readExceptionStatus (uint8_t *value)
- Modbus::StatusCode writeMultipleCoils (uint16_t offset, uint16_t count, const void *values)
- Modbus::StatusCode writeMultipleRegisters (uint16_t offset, uint16_t count, const uint16_t *values)
- Modbus::StatusCode readCoilsAsBoolArray (uint16_t offset, uint16_t count, bool *values)
- Modbus::StatusCode readDiscreteInputsAsBoolArray (uint16_t offset, uint16_t count, bool *values)
- Modbus::StatusCode writeMultipleCoilsAsBoolArray (uint16_t offset, uint16_t count, const bool *values)
- Modbus::StatusCode lastPortStatus () const
- Modbus::StatusCode lastPortErrorStatus () const
- const Modbus::Char * lastPortErrorText () const

Public Member Functions inherited from ModbusObject

- ModbusObject ()
- virtual ~ModbusObject ()
- const Modbus::Char * objectName () const
- void setObjectName (const Modbus::Char *name)
- template<class SignalClass , class T , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class SignalClass , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- template<class ReturnType , class ... Args>
  void disconnect (ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- void disconnectFunc (void *funcPtr)
- template<class T , class ReturnType , class ... Args>
  void disconnect (T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class T >
  void disconnect (T *object)

Additional Inherited Members

Static Public Member Functions inherited from ModbusObject

- static ModbusObject * sender ()

Protected Member Functions inherited from ModbusObject

- template<class T , class ... Args>
  void emitSignal (const char *thisMethodId, ModbusMethodPointer< T, void, Args ... > thisMethod, Args ... args)

7.7.1 Detailed Description

The `ModbusClient` class implements the interface of the client part of the Modbus protocol.

`ModbusClient` contains a list of Modbus functions that are implemented by the Modbus client program. It implements functions for reading and writing different types of Modbus memory that are defined by the specification. The operations that return `Modbus::StatusCode` are asynchronous, that is, if the operation is not completed, it returns the intermediate status `Modbus::Status_Processing`, and then it must be called until it is successfully completed or returns an error status.

7.7.2 Constructor & Destructor Documentation

7.7.2.1 ModbusClient()

```
ModbusClient::ModbusClient (
            uint8_t unit,
            ModbusClientPort * port )
```

Class constructor.

Parameters

in	*unit*	The address of the remote Modbus device to which this client is bound.
in	*port*	A pointer to the port object to which this client object belongs.

7.7.3 Member Function Documentation

7.7.3.1 isOpen()

```
bool ModbusClient::isOpen ( ) const
```

Returns `true` if communication with the remote device is established, `false` otherwise.

7.7.3.2 lastPortErrorStatus()

```
Modbus::StatusCode ModbusClient::lastPortErrorStatus ( ) const
```

Returns the status of the last error of the performed operation.

7.7.3.3 lastPortErrorText()

```
const Modbus::Char * ModbusClient::lastPortErrorText ( ) const
```

Returns text repr of the last error of the performed operation.

7.7.3.4 lastPortStatus()

```
Modbus::StatusCode ModbusClient::lastPortStatus ( ) const
```

Returns the status of the last operation performed.

7.7.3.5 port()

```
ModbusClientPort * ModbusClient::port ( ) const
```

Returns a pointer to the port object to which this client object belongs.

7.7.3.6 readCoils()

```
Modbus::StatusCode ModbusClient::readCoils (
            uint16_t offset,
            uint16_t count,
            void * values )
```

Same as ModbusInterface::readCoils(uint8_t unit, uint16_t offset, uint16_t count, void *va
but the address of the remote Modbus device is missing. It is preset in the constructor.

7.7.3.7 readCoilsAsBoolArray()

```
Modbus::StatusCode ModbusClient::readCoilsAsBoolArray (
            uint16_t offset,
            uint16_t count,
            bool * values )
```

Same as ModbusClientPort::readCoilsAsBoolArray(uint8_t unit, uint16_t offset, uint16_t cou
but the address of the remote Modbus device is missing. It is pre-set in the constructor.

7.7.3.8 readDiscreteInputs()

```
Modbus::StatusCode ModbusClient::readDiscreteInputs (
            uint16_t offset,
            uint16_t count,
            void * values )
```

Same as ModbusInterface::readDiscreteInputs(uint8_t unit, uint16_t offset, uint16_t count, but the address of the remote Modbus device is missing. It is preset in the constructor.

7.7.3.9 readDiscreteInputsAsBoolArray()

```
Modbus::StatusCode ModbusClient::readDiscreteInputsAsBoolArray (
            uint16_t offset,
            uint16_t count,
            bool * values )
```

Same as ModbusClientPort::readDiscreteInputsAsBoolArray(uint8_t unit, uint16_t offset, uir but the address of the remote Modbus device is missing. It is pre-set in the constructor.

7.7.3.10 readExceptionStatus()

```
Modbus::StatusCode ModbusClient::readExceptionStatus (
            uint8_t * value )
```

Same as ModbusInterface::readExceptionStatus(uint8_t unit, uint8_t *status), but the address of the remote Modbus device is missing. It is pre-set in the constructor.

7.7.3.11 readHoldingRegisters()

```
Modbus::StatusCode ModbusClient::readHoldingRegisters (
            uint16_t offset,
            uint16_t count,
            uint16_t * values )
```

Same as ModbusInterface::readHoldingRegisters(uint8_t unit, uint16_t offset, uint16_t cour but the address of the remote Modbus device is missing. It is pre-set in the constructor.

7.7.3.12 readInputRegisters()

```
Modbus::StatusCode ModbusClient::readInputRegisters (
            uint16_t offset,
            uint16_t count,
            uint16_t * values )
```

Same as ModbusInterface::readInputRegisters(uint8_t unit, uint16_t offset, uint16_t count, but the address of the remote Modbus device is missing. It is pre-set in the constructor.

7.7.3.13 setUnit()

```
void ModbusClient::setUnit (
            uint8_t unit )
```

Sets the address of the remote Modbus device to which this client is bound.

7.7.3.14 type()

```
Modbus::ProtocolType ModbusClient::type ( ) const
```

Returns the type of the Modbus protocol.

7.7.3.15 unit()

```
uint8_t ModbusClient::unit ( ) const
```

Returns the address of the remote Modbus device to which this client is bound.

7.7.3.16 writeMultipleCoils()

```
Modbus::StatusCode ModbusClient::writeMultipleCoils (
            uint16_t offset,
            uint16_t count,
            const void * values )
```

Same as ModbusInterface::writeMultipleCoils(uint8_t unit, uint16_t offset, uint16_t count, but the address of the remote Modbus device is missing. It is preset in the constructor.

7.7.3.17 writeMultipleCoilsAsBoolArray()

```
Modbus::StatusCode ModbusClient::writeMultipleCoilsAsBoolArray (
            uint16_t offset,
            uint16_t count,
            const bool * values )
```

Same as ModbusClientPort::writeMultipleCoilsAsBoolArray(uint8_t unit, uint16_t offset, uir but the address of the remote Modbus device is missing. It is preset in the constructor.

7.7.3.18 writeMultipleRegisters()

```
Modbus::StatusCode ModbusClient::writeMultipleRegisters (
            uint16_t offset,
            uint16_t count,
            const uint16_t * values )
```

Same as ModbusInterface::writeMultipleRegisters(uint8_t unit, uint16_t offset, uint16_t co but the address of the remote Modbus device is missing. It is pre-set in the constructor.

7.7.3.19 writeSingleCoil()

```
Modbus::StatusCode ModbusClient::writeSingleCoil (
            uint16_t offset,
            bool value )
```

Same as ModbusInterface::writeSingleCoil(uint8_t unit, uint16_t offset, bool value), but the address of the remote Modbus device is missing. It is pre-set in the constructor.

7.7.3.20 writeSingleRegister()

```
Modbus::StatusCode ModbusClient::writeSingleRegister (
            uint16_t offset,
            uint16_t value )
```

Same as ModbusInterface::writeSingleRegister(uint8_t unit, uint16_t offset, uint16_t value
but the address of the remote Modbus device is missing. It is pre-set in the constructor.

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

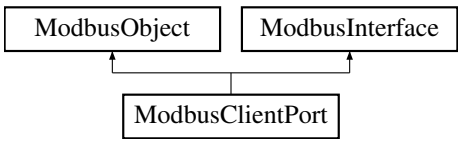
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusClient.h

7.8 ModbusClientPort Class Reference

The ModbusClientPort class implements the algorithm of the client part of the Modbus communication protocol port.

`#include <ModbusClientPort.h>`

Inheritance diagram for ModbusClientPort:



Public Types

- enum RequestStatus { **Enable** , **Disable** , **Process** }

  Sets the status of the request for the client.

Public Member Functions

- ModbusClientPort (ModbusPort *port)
- Modbus::ProtocolType type () const
- ModbusPort * port () const
- Modbus::StatusCode close ()
- bool isOpen () const
- uint32_t repeatCount () const
- void setRepeatCount (uint32_t v)
- Modbus::StatusCode readCoils (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, void *values)
- Modbus::StatusCode readDiscreteInputs (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, void *values)
- Modbus::StatusCode readHoldingRegisters (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, uint16_t *values)
- Modbus::StatusCode readInputRegisters (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, uint16_t *values)
- Modbus::StatusCode writeSingleCoil (ModbusObject *client, uint8_t unit, uint16_t offset, bool value)
- Modbus::StatusCode writeSingleRegister (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t value)
- Modbus::StatusCode readExceptionStatus (ModbusObject *client, uint8_t unit, uint8_t *value)
- Modbus::StatusCode writeMultipleCoils (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, const void *values)
- Modbus::StatusCode writeMultipleRegisters (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, const uint16_t *values)
- Modbus::StatusCode readCoilsAsBoolArray (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, bool *values)
- Modbus::StatusCode readDiscreteInputsAsBoolArray (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, bool *values)
- Modbus::StatusCode writeMultipleCoilsAsBoolArray (ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count, const bool *values)
- Modbus::StatusCode readCoils (uint8_t unit, uint16_t offset, uint16_t count, void *values) override
- Modbus::StatusCode readDiscreteInputs (uint8_t unit, uint16_t offset, uint16_t count, void *values) override
- Modbus::StatusCode readHoldingRegisters (uint8_t unit, uint16_t offset, uint16_t count, uint16_t *values) override
- Modbus::StatusCode readInputRegisters (uint8_t unit, uint16_t offset, uint16_t count, uint16_t *values) override
- Modbus::StatusCode writeSingleCoil (uint8_t unit, uint16_t offset, bool value) override
- Modbus::StatusCode writeSingleRegister (uint8_t unit, uint16_t offset, uint16_t value) override
- Modbus::StatusCode readExceptionStatus (uint8_t unit, uint8_t *value) override
- Modbus::StatusCode writeMultipleCoils (uint8_t unit, uint16_t offset, uint16_t count, const void *values) override
- Modbus::StatusCode writeMultipleRegisters (uint8_t unit, uint16_t offset, uint16_t count, const uint16_t *values) override
- Modbus::StatusCode readCoilsAsBoolArray (uint8_t unit, uint16_t offset, uint16_t count, bool *values)
- Modbus::StatusCode readDiscreteInputsAsBoolArray (uint8_t unit, uint16_t offset, uint16_t count, bool *values)
- Modbus::StatusCode writeMultipleCoilsAsBoolArray (uint8_t unit, uint16_t offset, uint16_t count, const bool *values)
- Modbus::StatusCode lastStatus () const
- Modbus::StatusCode lastErrorStatus () const
- const Modbus::Char * lastErrorText () const
- const ModbusObject * currentClient () const
- RequestStatus getRequestStatus (ModbusObject *client)
- void cancelRequest (ModbusObject *client)
- void signalOpened (const Modbus::Char *source)
- void signalClosed (const Modbus::Char *source)
- void signalTx (const Modbus::Char *source, const uint8_t *buff, uint16_t size)
- void signalRx (const Modbus::Char *source, const uint8_t *buff, uint16_t size)
- void signalError (const Modbus::Char *source, Modbus::StatusCode status, const Modbus::Char *text)

Public Member Functions inherited from ModbusObject

- ModbusObject ()
- virtual ~ModbusObject ()
- const Modbus::Char * objectName () const
- void setObjectName (const Modbus::Char *name)
- template<class SignalClass , class T , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class SignalClass , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- template<class ReturnType , class ... Args>
  void disconnect (ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- void disconnectFunc (void *funcPtr)
- template<class T , class ReturnType , class ... Args>
  void disconnect (T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class T >
  void disconnect (T *object)

Friends

- class **ModbusClient**

Additional Inherited Members

Static Public Member Functions inherited from ModbusObject

- static ModbusObject * sender ()

Protected Member Functions inherited from ModbusObject

- template<class T , class ... Args>
  void emitSignal (const char *thisMethodId, ModbusMethodPointer< T, void, Args ... > thisMethod, Args ... args)

7.8.1 Detailed Description

The `ModbusClientPort` class implements the algorithm of the client part of the Modbus communication protocol port.

`ModbusClient` contains a list of Modbus functions that are implemented by the Modbus client program. It implements functions for reading and writing various types of Modbus memory defined by the specification. In the non blocking mode if the operation is not completed it returns the intermediate status `Modbus::Status_Processing`, and then it must be called until it is successfully completed or returns an error status.

`ModbusClientPort` has number of Modbus functions with interface like `readCoils(ModbusObject *client, ...)`. Several clients can automatically share a current `ModbusClientPort` resource. The first one to access the port seizes the resource until the operation with the remote device is completed. Then the first client will release the resource and the next client in the queue will capture it, and so on in a circle.

```
#include <ModbusClient.h>
```

```
//...
void main()
{
    //...
    ModbusClientPort *port = Modbus::createClientPort(Modbus::TCP, &settings, false);
    ModbusClient c1(1, port);
    ModbusClient c2(2, port);
    ModbusClient c3(3, port);
    Modbus::StatusCode s1, s2, s3;
    //...
    while(1)
    {
        s1 = c1.readHoldingRegisters(0, 10, values);
        s2 = c2.readHoldingRegisters(0, 10, values);
        s3 = c3.readHoldingRegisters(0, 10, values);
        doSomeOtherStuffInCurrentThread();
        Modbus::msleep(1);
    }
    //...
}
//...
```

7.8.2 Constructor & Destructor Documentation

7.8.2.1 ModbusClientPort()

```
ModbusClientPort::ModbusClientPort (
            ModbusPort * port )
```

Constructor of the class.

Parameters

in	*port*	A pointer to the port object to which this client object belongs.

7.8.3 Member Function Documentation

7.8.3.1 cancelRequest()

```
void ModbusClientPort::cancelRequest (
            ModbusObject * client )
```

Cancels the previous request specified by the `*rp` pointer for the client.

7.8.3.2 close()

```
Modbus::StatusCode ModbusClientPort::close ( )
```

Closes connection and returns status of the operation.

7.8.3.3 currentClient()

```
const ModbusObject * ModbusClientPort::currentClient ( ) const
```

Returns a pointer to the client object whose request is currently being processed by the current port.

7.8.3.4 getRequestStatus()

```
RequestStatus ModbusClientPort::getRequestStatus (
            ModbusObject * client )
```

Returns status the current request for `client`.
The client usually calls this function to determine whether its request is pending/finished/blocked. If function returns `Enable`, `client` has just became current and can make request to the port, `Process` - current `client` is already processing, `Disable` - other client owns the port.

7.8.3.5 isOpen()

```
bool ModbusClientPort::isOpen ( ) const
```

Returns `true` if the connection with the remote device is established, `false` otherwise.

7.8.3.6 lastErrorStatus()

```
Modbus::StatusCode ModbusClientPort::lastErrorStatus ( ) const
```

Returns the status of the last error of the performed operation.

7.8.3.7 lastErrorText()

```
const Modbus::Char * ModbusClientPort::lastErrorText ( ) const
```

Returns the text of the last error of the performed operation.

7.8.3.8 lastStatus()

```
Modbus::StatusCode ModbusClientPort::lastStatus ( ) const
```

Returns the status of the last operation performed.

7.8.3.9 port()

```
ModbusPort * ModbusClientPort::port ( ) const
```

Returns a pointer to the port object that uses this algorithm.

7.8.3.10 readCoils() [1/2]

```
Modbus::StatusCode ModbusClientPort::readCoils (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            void * values )
```

Same as `ModbusClientPort::readCoils(uint8_t unit, uint16_t offset, uint16_t count, void *v` but has `client` as first parameter to seize current `ModbusClientPort` resource.

7.8.3.11 readCoils() [2/2]

```
Modbus::StatusCode ModbusClientPort::readCoils (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            void * values ) [override], [virtual]
```

Function for read discrete outputs (coils, 0x bits).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of coils (bits).
out	*values*	Pointer to the output buffer (bit array) where the read values are stored.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented from ModbusInterface.

7.8.3.12 readCoilsAsBoolArray() [1/2]

```
Modbus::StatusCode ModbusClientPort::readCoilsAsBoolArray (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            bool * values )
```

Same as `ModbusClientPort::readCoilsAsBoolArray(uint8_t unit, uint16_t offset, uint16_t cou` but has `client` as first parameter to seize current `ModbusClientPort` resource.

7.8.3.13 readCoilsAsBoolArray() [2/2]

```
Modbus::StatusCode ModbusClientPort::readCoilsAsBoolArray (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            bool * values ) [inline]
```

Same as `ModbusClientPort::readCoils(uint8_t unit, uint16_t offset, uint16_t count, void *v` but the output buffer of values `values` is an array, where each discrete value is located in a separate element of the array of type `bool`.

7.8.3.14 readDiscreteInputs() [1/2]

```
Modbus::StatusCode ModbusClientPort::readDiscreteInputs (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            void * values )
```

Same as ModbusClientPort::readDiscreteInputs(uint8_t unit, uint16_t offset, uint16_t count but has client as first parameter to seize current ModbusClientPort resource.

7.8.3.15 readDiscreteInputs() [2/2]

```
Modbus::StatusCode ModbusClientPort::readDiscreteInputs (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            void * values ) [override], [virtual]
```

Function for read digital inputs (1x bits).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of inputs (bits).
out	*values*	Pointer to the output buffer (bit array) where the read values are stored.

Returns

The result Modbus::StatusCode of the operation. Default implementation returns Status_Bad↩ IllegalFunction.

Reimplemented from ModbusInterface.

7.8.3.16 readDiscreteInputsAsBoolArray() [1/2]

```
Modbus::StatusCode ModbusClientPort::readDiscreteInputsAsBoolArray (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            bool * values )
```

Same as ModbusClientPort::readDiscreteInputsAsBoolArray(uint8_t unit, uint16_t offset, uir but has client as first parameter to seize current ModbusClientPort resource.

7.8.3.17 readDiscreteInputsAsBoolArray() [2/2]

```
Modbus::StatusCode ModbusClientPort::readDiscreteInputsAsBoolArray (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            bool * values )  [inline]
```

Same as ModbusClientPort::readDiscreteInputs(uint8_t unit, uint16_t offset, uint16_t count but the output buffer of values `values` is an array, where each discrete value is located in a separate element of the array of type `bool`.

7.8.3.18 readExceptionStatus() [1/2]

```
Modbus::StatusCode ModbusClientPort::readExceptionStatus (
            ModbusObject * client,
            uint8_t unit,
            uint8_t * value )
```

Same as ModbusClientPort::readExceptionStatus(uint8_t unit, uint8_t *status) but has `client` as first parameter to seize current ModbusClientPort resource.

7.8.3.19 readExceptionStatus() [2/2]

```
Modbus::StatusCode ModbusClientPort::readExceptionStatus (
            uint8_t unit,
            uint8_t * status )  [override], [virtual]
```

Function to read ExceptionStatus.

Parameters

in	*unit*	Address of the remote Modbus device.
out	*status*	Pointer to the byte (bit array) where the exception status is stored.

Returns

The result Modbus::StatusCode of the operation. Default implementation returns `Status_Bad↩ IllegalFunction`.

Reimplemented from ModbusInterface.

7.8.3.20 readHoldingRegisters() [1/2]

```
Modbus::StatusCode ModbusClientPort::readHoldingRegisters (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )
```

Same as ModbusClientPort::readHoldingRegisters(uint8_t unit, uint16_t offset, uint16_t cou but has `client` as first parameter to seize current ModbusClientPort resource.

7.8.3.21 readHoldingRegisters() [2/2]

```
Modbus::StatusCode ModbusClientPort::readHoldingRegisters (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )  [override], [virtual]
```

Function for read holding (output) 16-bit registers (4x regs).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of registers.
out	*values*	Pointer to the output buffer (bit array) where the read values are stored.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented from ModbusInterface.

7.8.3.22 readInputRegisters() [1/2]

```
Modbus::StatusCode ModbusClientPort::readInputRegisters (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )
```

Same as `ModbusClientPort::readInputRegisters(uint8_t unit, uint16_t offset, uint16_t count` but has `client` as first parameter to seize current `ModbusClientPort` resource.

7.8.3.23 readInputRegisters() [2/2]

```
Modbus::StatusCode ModbusClientPort::readInputRegisters (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )  [override], [virtual]
```

Function for read input 16-bit registers (3x regs).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of registers.
out	*values*	Pointer to the output buffer (bit array) where the read values are stored.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩ IllegalFunction`.

Reimplemented from ModbusInterface.

7.8.3.24 repeatCount()

```
uint32_t ModbusClientPort::repeatCount ( ) const
```

Returns the setting of the number of repetitions of the Modbus request if it fails.

7.8.3.25 setRepeatCount()

```
void ModbusClientPort::setRepeatCount (
            uint32_t v )
```

Sets the number of times a Modbus request is repeated if it fails.

7.8.3.26 signalClosed()

```
void ModbusClientPort::signalClosed (
            const Modbus::Char * source )
```

Calls each callback of the port when the port is closed. `source` - current port's name

7.8.3.27 signalError()

```
void ModbusClientPort::signalError (
            const Modbus::Char * source,
            Modbus::StatusCode status,
            const Modbus::Char * text )
```

Calls each callback of the port when error is occured with error's status and text.

7.8.3.28 signalOpened()

```
void ModbusClientPort::signalOpened (
            const Modbus::Char * source )
```

Calls each callback of the port when the port is opened. `source` - current port's name

7.8.3.29 signalRx()

```
void ModbusClientPort::signalRx (
            const Modbus::Char * source,
            const uint8_t * buff,
            uint16_t size )
```

Calls each callback of the incoming packet 'Rx' from the internal list of callbacks, passing them the input array 'buff' and its size 'size'.

7.8.3.30 signalTx()

```
void ModbusClientPort::signalTx (
            const Modbus::Char * source,
            const uint8_t * buff,
            uint16_t size )
```

Calls each callback of the original packet 'Tx' from the internal list of callbacks, passing them the original array 'buff' and its size 'size'.

7.8.3.31 type()

```
Modbus::ProtocolType ModbusClientPort::type ( ) const
```

Returns type of Modbus protocol.

7.8.3.32 writeMultipleCoils() [1/2]

```
Modbus::StatusCode ModbusClientPort::writeMultipleCoils (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const void * values )
```

Same as `ModbusClientPort::writeMultipleCoils(uint8_t unit, uint16_t offset, uint16_t count` but has `client` as first parameter to seize current `ModbusClientPort` resource.

7.8.3.33 writeMultipleCoils() [2/2]

```
Modbus::StatusCode ModbusClientPort::writeMultipleCoils (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const void * values )  [override], [virtual]
```

Function for write discrete outputs (coils, 0x bits).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of coils.
out	*values*	Pointer to the input buffer (bit array) which values must be written.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented from ModbusInterface.

7.8.3.34 writeMultipleCoilsAsBoolArray() [1/2]

```
Modbus::StatusCode ModbusClientPort::writeMultipleCoilsAsBoolArray (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const bool * values )
```

Same as ModbusClientPort::writeMultipleCoilsAsBoolArray(uint8_t unit, uint16_t offset, uir but has client as first parameter to seize current ModbusClientPort resource.

7.8.3.35 writeMultipleCoilsAsBoolArray() [2/2]

```
Modbus::StatusCode ModbusClientPort::writeMultipleCoilsAsBoolArray (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const bool * values )  [inline]
```

Same as ModbusClientPort::writeMultipleCoils(uint8_t unit, uint16_t offset, uint16_t count but the input buffer of values values is an array, where each discrete value is located in a separate element of the array of type bool.

7.8.3.36 writeMultipleRegisters() [1/2]

```
Modbus::StatusCode ModbusClientPort::writeMultipleRegisters (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const uint16_t * values )
```

Same as ModbusClientPort::writeMultipleRegisters(uint8_t unit, uint16_t offset, uint16_t c but has client as first parameter to seize current ModbusClientPort resource.

7.8.3.37 writeMultipleRegisters() [2/2]

```
Modbus::StatusCode ModbusClientPort::writeMultipleRegisters (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const uint16_t * values )  [override], [virtual]
```

Function for write holding (output) 16-bit registers (4x regs).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of registers.
out	*values*	Pointer to the input buffer which values must be written.

Returns

The result Modbus::StatusCode of the operation. Default implementation returns Status_Bad↩ IllegalFunction.

Reimplemented from ModbusInterface.

7.8.3.38 writeSingleCoil() [1/2]

```
Modbus::StatusCode ModbusClientPort::writeSingleCoil (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            bool value )
```

Same as ModbusClientPort::writeSingleCoil(uint8_t unit, uint16_t offset, bool value) but has client as first parameter to seize current ModbusClientPort resource.

7.8.3.39 writeSingleCoil() [2/2]

```
Modbus::StatusCode ModbusClientPort::writeSingleCoil (
            uint8_t unit,
            uint16_t offset,
            bool value )  [override], [virtual]
```

Function for write one separate discrete output (0x coil).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
out	*value*	Boolean value to be set.

Returns

The result Modbus::StatusCode of the operation. Default implementation returns Status_Bad↩ IllegalFunction.

Reimplemented from ModbusInterface.

7.8.3.40 writeSingleRegister() [1/2]

```
Modbus::StatusCode ModbusClientPort::writeSingleRegister (
            ModbusObject * client,
            uint8_t unit,
            uint16_t offset,
            uint16_t value )
```

Same as ModbusClientPort::writeSingleRegister(uint8_t unit, uint16_t offset, uint16_t valu but has client as first parameter to seize current ModbusClientPort resource.

7.8.3.41 writeSingleRegister() [2/2]

```
Modbus::StatusCode ModbusClientPort::writeSingleRegister (
            uint8_t unit,
            uint16_t offset,
            uint16_t value )  [override], [virtual]
```

Function for write one separate 16-bit holding register (4x).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
out	*value*	16-bit unsigned integer value to be set.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented from ModbusInterface.

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

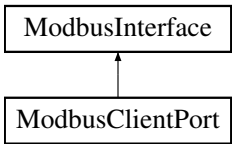
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusClientPort.h

7.9 ModbusInterface Class Reference

Main interface of Modbus communication protocol.

`#include <Modbus.h>`

Inheritance diagram for ModbusInterface:



Public Member Functions

- virtual Modbus::StatusCode readCoils (uint8_t unit, uint16_t offset, uint16_t count, void *values)
- virtual Modbus::StatusCode readDiscreteInputs (uint8_t unit, uint16_t offset, uint16_t count, void *values)
- virtual Modbus::StatusCode readHoldingRegisters (uint8_t unit, uint16_t offset, uint16_t count, uint16_↩t *values)
- virtual Modbus::StatusCode readInputRegisters (uint8_t unit, uint16_t offset, uint16_t count, uint16_t *values)
- virtual Modbus::StatusCode writeSingleCoil (uint8_t unit, uint16_t offset, bool value)
- virtual Modbus::StatusCode writeSingleRegister (uint8_t unit, uint16_t offset, uint16_t value)
- virtual Modbus::StatusCode readExceptionStatus (uint8_t unit, uint8_t *status)
- virtual Modbus::StatusCode writeMultipleCoils (uint8_t unit, uint16_t offset, uint16_t count, const void *values)
- virtual Modbus::StatusCode writeMultipleRegisters (uint8_t unit, uint16_t offset, uint16_t count, const uint16_t *values)

7.9.1 Detailed Description

Main interface of Modbus communication protocol.

ModbusInterface constains list of functions that ModbusLib is supported. There are such functions as: 1 (0x01) - READ_COILS 2 (0x02) - READ_DISCRETE_INPUTS 3 (0x03) - READ_HOLDING_REGISTERS 4 (0x04) - READ_INPUT_REGISTERS 5 (0x05) - WRITE_SINGLE_COIL 6 (0x06) - WRITE_SINGLE_REGISTER 7 (0x07) - READ_EXCEPTION_STATUS 15 (0x0F) - WRITE_MULTIPLE_COILS 16 (0x10) - WRITE_MULTIPLE_REGISTERS

Default implementation of every Modbus function returns Modbus::Status_BadIllegalFunction.

7.9.2 Member Function Documentation

7.9.2.1 readCoils()

```
virtual Modbus::StatusCode ModbusInterface::readCoils (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            void * values )  [virtual]
```

Function for read discrete outputs (coils, 0x bits).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of coils (bits).
out	*values*	Pointer to the output buffer (bit array) where the read values are stored.

Returns

The result Modbus::StatusCode of the operation. Default implementation returns Status_BadIllegalFunction.

Reimplemented in ModbusClientPort.

7.9.2.2 readDiscreteInputs()

```
virtual Modbus::StatusCode ModbusInterface::readDiscreteInputs (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            void * values )  [virtual]
```

Function for read digital inputs (1x bits).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of inputs (bits).
out	*values*	Pointer to the output buffer (bit array) where the read values are stored.

Returns

The result Modbus::StatusCode of the operation. Default implementation returns Status_Bad↩ IllegalFunction.

Reimplemented in ModbusClientPort.

7.9.2.3 readExceptionStatus()

```
virtual Modbus::StatusCode ModbusInterface::readExceptionStatus (
            uint8_t unit,
            uint8_t * status )  [virtual]
```

Function to read ExceptionStatus.

Parameters

in	*unit*	Address of the remote Modbus device.
out	*status*	Pointer to the byte (bit array) where the exception status is stored.

Returns

The result Modbus::StatusCode of the operation. Default implementation returns Status_Bad↩ IllegalFunction.

Reimplemented in ModbusClientPort.

7.9.2.4 readHoldingRegisters()

```
virtual Modbus::StatusCode ModbusInterface::readHoldingRegisters (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )  [virtual]
```

Function for read holding (output) 16-bit registers (4x regs).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of registers.
out	*values*	Pointer to the output buffer (bit array) where the read values are stored.

Returns

The result Modbus::StatusCode of the operation. Default implementation returns Status_Bad↩ IllegalFunction.

Reimplemented in ModbusClientPort.

7.9.2.5 readInputRegisters()

```
virtual Modbus::StatusCode ModbusInterface::readInputRegisters (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )  [virtual]
```

Function for read input 16-bit registers (3x regs).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of registers.
out	*values*	Pointer to the output buffer (bit array) where the read values are stored.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented in ModbusClientPort.

7.9.2.6 writeMultipleCoils()

```
virtual Modbus::StatusCode ModbusInterface::writeMultipleCoils (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const void * values )  [virtual]
```

Function for write discrete outputs (coils, 0x bits).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of coils.
out	*values*	Pointer to the input buffer (bit array) which values must be written.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented in ModbusClientPort.

7.9.2.7 writeMultipleRegisters()

```
virtual Modbus::StatusCode ModbusInterface::writeMultipleRegisters (
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const uint16_t * values )  [virtual]
```

Function for write holding (output) 16-bit registers (4x regs).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
in	*count*	Count of registers.
out	*values*	Pointer to the input buffer which values must be written.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented in ModbusClientPort.

7.9.2.8 writeSingleCoil()

```
virtual Modbus::StatusCode ModbusInterface::writeSingleCoil (
            uint8_t unit,
            uint16_t offset,
            bool value )  [virtual]
```

Function for write one separate discrete output (0x coil).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
out	*value*	Boolean value to be set.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented in ModbusClientPort.

7.9.2.9 writeSingleRegister()

```
virtual Modbus::StatusCode ModbusInterface::writeSingleRegister (
            uint8_t unit,
```

```
        uint16_t offset,
        uint16_t value )  [virtual]
```

Function for write one separate 16-bit holding register (4x).

Parameters

in	*unit*	Address of the remote Modbus device.
in	*offset*	Starting offset (0-based).
out	*value*	16-bit unsigned integer value to be set.

Returns

The result `Modbus::StatusCode` of the operation. Default implementation returns `Status_Bad↩IllegalFunction`.

Reimplemented in ModbusClientPort.

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

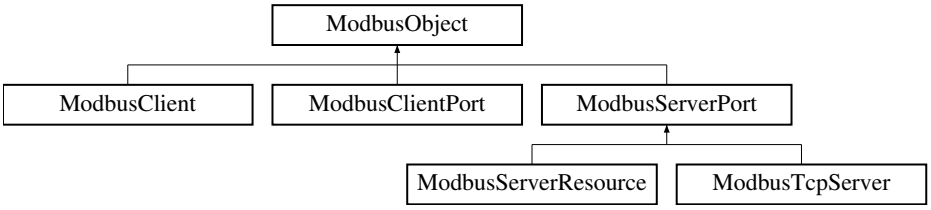
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/Modbus.h

7.10 ModbusObject Class Reference

The `ModbusObject` class is the base class for objects that use signal/slot mechanism.

`#include <ModbusObject.h>`

Inheritance diagram for ModbusObject:



Public Member Functions

- ModbusObject ()
- virtual ~ModbusObject ()
- const Modbus::Char * objectName () const
- void setObjectName (const Modbus::Char *name)
- template<class SignalClass , class T , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class SignalClass , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- template<class ReturnType , class ... Args>
  void disconnect (ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- void disconnectFunc (void *funcPtr)
- template<class T , class ReturnType , class ... Args>
  void disconnect (T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class T >
  void disconnect (T *object)

Static Public Member Functions

- static ModbusObject * sender ()

Protected Member Functions

- template<class T , class ... Args>
  void emitSignal (const char *thisMethodId, ModbusMethodPointer< T, void, Args ... > thisMethod, Args ... args)

7.10.1 Detailed Description

The `ModbusObject` class is the base class for objects that use signal/slot mechanism.

`ModbusObject` is designed to be a base class for objects that need to use simplified Qt-like signal/slot mechanism. User can connect signal of the object he want to listen to his own function or method of his own class and then it can be disconnected if he is not interesting of this signal anymore. Callbacks will be called in order which it were connected.

`ModbusObject` has a map which key means signal identifier (pointer to signal) and value is a list of callbacks functions/methods connected to this signal.

`ModbusObject` has `objectName()` and `setObjectName` methods. This methods can be used to simply identify object which is signal's source (e.g. to print info in console).

Note

`ModbusObject` class is not thread safe

7.10.2 Constructor & Destructor Documentation

7.10.2.1 ModbusObject()

```
ModbusObject::ModbusObject ( )
```

Constructor of the class.

7.10.2.2 ~ModbusObject()

```
virtual ModbusObject::~ModbusObject ( )  [virtual]
```

Virtual destructor of the class.

7.10.3 Member Function Documentation

7.10.3.1 connect() [1/2]

```
template<class SignalClass , class ReturnType , class ...  Args>
void ModbusObject::connect (
            ModbusMethodPointer< SignalClass, ReturnType, Args ...  > signalMethodPtr,
            ModbusFunctionPointer< ReturnType, Args ...  > funcPtr )  [inline]
```

Same as `ModbusObject::connect(ModbusMethodPointer, T*, ModbusMethodPointer)` but connects `ModbusFunctionPointer` to current object's signal `signalMethodPtr`.

7.10.3.2 connect() [2/2]

```
template<class SignalClass , class T , class ReturnType , class ...  Args>
void ModbusObject::connect (
            ModbusMethodPointer< SignalClass, ReturnType, Args ...  > signalMethodPtr,
            T * object,
            ModbusMethodPointer< T, ReturnType, Args ...  > objectMethodPtr )  [inline]
```

Connect `this` object's signal `signalMethodPtr` to the `objects` method `objectMethodPtr`.

```
class MyClass : public ModbusObject { public: void signalSomething(int a, int b) {
      emitSignal(&MyClass::signalSomething, a, b); } };
class MyReceiver { public: void slotSomething(int a, int b) { doSomething(); } };
MyClass c;
MyReceiver r;
c.connect(&MyClass::signalSomething, r, &MyReceiver::slotSomething);
```

Note

`SignalClass` template type refers to any class but it must be `this` or derived class. It makes separate `SignalClass` to easely refers signal of the derived class.

7.10.3.3 disconnect() [1/3]

```
template<class ReturnType , class ...  Args>
void ModbusObject::disconnect (
            ModbusFunctionPointer< ReturnType, Args ...  > funcPtr )  [inline]
```

Disconnects function `funcPtr` from all signals of current object.

7.10.3.4 disconnect() [2/3]

```
template<class T >
void ModbusObject::disconnect (
            T * object )  [inline]
```

Disconnect all slots of `T *object` from all signals of current object.

7.10.3.5 disconnect() [3/3]

```
template<class T , class ReturnType , class ...  Args>
void ModbusObject::disconnect (
            T * object,
            ModbusMethodPointer< T, ReturnType, Args ...  > objectMethodPtr )  [inline]
```

Disconnects slot represented by pair `(object, objectMethodPtr)` from all signals of current object.

7.10.3.6 disconnectFunc()

```
void ModbusObject::disconnectFunc (
            void * funcPtr )  [inline]
```

Disconnects function `funcPtr` from all signals of current object, but `funcPtr` is a void pointer.

7.10.3.7 emitSignal()

```
template<class T , class ...  Args>
void ModbusObject::emitSignal (
             const char * thisMethodId,
             ModbusMethodPointer< T, void, Args ...  > thisMethod,
             Args ...  args )  [inline], [protected]
```

Template method for emit signal. Must be called from within of the signal method.

7.10.3.8 objectName()

```
const Modbus::Char * ModbusObject::objectName ( ) const
```

Returns a pointer to current object's name string.

7.10.3.9 sender()

```
static ModbusObject * ModbusObject::sender ( )  [static]
```

Returns a pointer to the object that sent the signal. This pointer is valid in thread where signal was occured only. So this function must be called only within the slot that is a callback of signal occured.

7.10.3.10 setObjectName()

```
void ModbusObject::setObjectName (
             const Modbus::Char * name )
```

Set name of current object.

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

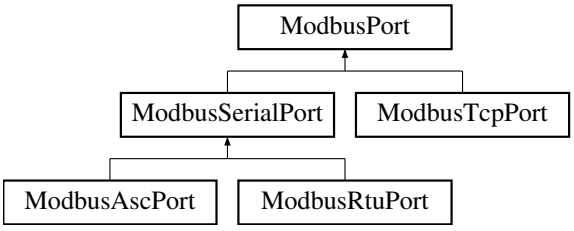
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusObject.h

7.11 ModbusPort Class Reference

The abstract class `ModbusPort` is the base class for a specific implementation of the Modbus communication protocol.

```
#include <ModbusPort.h>
```

Inheritance diagram for ModbusPort:



Public Member Functions

- virtual ~ModbusPort ()
- virtual Modbus::ProtocolType type () const =0
- virtual Modbus::Handle handle () const =0
- virtual Modbus::StatusCode open ()=0
- virtual Modbus::StatusCode close ()=0
- virtual bool isOpen () const =0
- virtual void setNextRequestRepeated (bool v)
- bool isChanged () const
- bool isServerMode () const
- virtual void setServerMode (bool mode)
- bool isBlocking () const
- bool isNonBlocking () const
- Modbus::StatusCode lastErrorStatus () const
- const Modbus::Char * lastErrorText () const
- virtual Modbus::StatusCode writeBuffer (uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff)=0
- virtual Modbus::StatusCode readBuffer (uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t maxSzBuff, uint16_t *szOutBuff)=0
- virtual Modbus::StatusCode write ()=0
- virtual Modbus::StatusCode read ()=0
- virtual const uint8_t * readBufferData () const =0
- virtual uint16_t readBufferSize () const =0
- virtual const uint8_t * writeBufferData () const =0
- virtual uint16_t writeBufferSize () const =0

Protected Member Functions

- Modbus::StatusCode setError (Modbus::StatusCode status, const Modbus::Char *text)

7.11.1 Detailed Description

The abstract class `ModbusPort` is the base class for a specific implementation of the Modbus communication protocol.

`ModbusPort` contains general functions for working with a specific port, implementing a specific version of the Modbus communication protocol. For example, versions for working with a TCP port or a serial port.

7.11.2 Constructor & Destructor Documentation

7.11.2.1 ~ModbusPort()

```
virtual ModbusPort::~ModbusPort ( )  [virtual]
```

Virtual destructor.

7.11.3 Member Function Documentation

7.11.3.1 close()

```
virtual Modbus::StatusCode ModbusPort::close ( )  [pure virtual]
```

Closes the port (breaks the connection) and returns the status the result status.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.2 handle()

```
virtual Modbus::Handle ModbusPort::handle ( ) const  [pure virtual]
```

Returns the native handle value that depenp on OS used. For TCP it socket handle, for serial port - file handle.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.3 isBlocking()

```
bool ModbusPort::isBlocking ( ) const
```

Returns `true` if the port works in synch (blocking) mode, `false` otherwise.

7.11.3.4 isChanged()

```
bool ModbusPort::isChanged ( ) const
```

Returns `true` if the port settings have been changed and the port needs to be reopened/reestablished communication with the remote device, `false` otherwise.

7.11.3.5 isNonBlocking()

```
bool ModbusPort::isNonBlocking ( ) const
```

Returns `true` if the port works in asynch (nonblocking) mode, `false` otherwise.

7.11.3.6 isOpen()

```
virtual bool ModbusPort::isOpen ( ) const  [pure virtual]
```

Returns `true` if the port is open/communication with the remote device is established, `false` otherwise.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.7 isServerMode()

```
bool ModbusPort::isServerMode ( ) const
```

Returns `true` if the port works in server mode, `false` otherwise.

7.11.3.8 lastErrorStatus()

```
Modbus::StatusCode ModbusPort::lastErrorStatus ( ) const
```

Returns the status of the last error of the performed operation.

7.11.3.9 lastErrorText()

```
const Modbus::Char * ModbusPort::lastErrorText ( ) const
```

Returns the pointer to `const Char` text buffer of the last error of the performed operation.

7.11.3.10 open()

```
virtual Modbus::StatusCode ModbusPort::open ( )  [pure virtual]
```

Opens port (create connection) for further operations and returns the result status.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.11 read()

```
virtual Modbus::StatusCode ModbusPort::read ( )  [pure virtual]
```

Implements the algorithm for reading from the port and returns the status of the operation.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.12 readBuffer()

```
virtual Modbus::StatusCode ModbusPort::readBuffer (
            uint8_t & unit,
            uint8_t & func,
            uint8_t * buff,
            uint16_t maxSzBuff,
            uint16_t * szOutBuff )  [pure virtual]
```

The function parses the packet that the `read()` function puts into the buffer, checks it for correctness, extracts its parameters, and returns the status of the operation.

Implemented in ModbusAscPort, ModbusRtuPort, and ModbusTcpPort.

7.11.3.13 readBufferData()

```
virtual const uint8_t * ModbusPort::readBufferData ( ) const  [pure virtual]
```

Returns pointer to data of read buffer.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.14 readBufferSize()

```
virtual uint16_t ModbusPort::readBufferSize ( ) const  [pure virtual]
```

Returns size of data of read buffer.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.15 setError()

```
Modbus::StatusCode ModbusPort::setError (
            Modbus::StatusCode status,
            const Modbus::Char * text )  [protected]
```

Sets the error parameters of the last operation performed.

7.11.3.16 setNextRequestRepeated()

```
virtual void ModbusPort::setNextRequestRepeated (
            bool v )  [virtual]
```

For the TCP version of the Modbus protocol. The identifier of each subsequent parcel is automatically increased by 1. If you set `setNextRequestRepeated(true)` then the next ID will not be increased by 1 but for only one next parcel.

Reimplemented in ModbusTcpPort.

7.11.3.17 setServerMode()

```
virtual void ModbusPort::setServerMode (
            bool mode )  [virtual]
```

Sets server mode if `true`, `false` for client mode.

7.11.3.18 type()

```
virtual Modbus::ProtocolType ModbusPort::type ( ) const  [pure virtual]
```

Returns the Modbus protocol type.

Implemented in ModbusAscPort, ModbusRtuPort, and ModbusTcpPort.

7.11.3.19 write()

```
virtual Modbus::StatusCode ModbusPort::write ( )  [pure virtual]
```

Implements the algorithm for writing to the port and returns the status of the operation.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.20 writeBuffer()

```
virtual Modbus::StatusCode ModbusPort::writeBuffer (
            uint8_t unit,
            uint8_t func,
            uint8_t * buff,
            uint16_t szInBuff )  [pure virtual]
```

The function directly generates a packet and places it in the buffer for further sending. Returns the status of the operation.

Implemented in ModbusAscPort, ModbusRtuPort, and ModbusTcpPort.

7.11.3.21 writeBufferData()

```
virtual const uint8_t * ModbusPort::writeBufferData ( ) const  [pure virtual]
```

Returns pointer to data of write buffer.

Implemented in ModbusSerialPort, and ModbusTcpPort.

7.11.3.22 writeBufferSize()

```
virtual uint16_t ModbusPort::writeBufferSize ( ) const  [pure virtual]
```

Returns size of data of write buffer.

Implemented in ModbusSerialPort, and ModbusTcpPort.

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

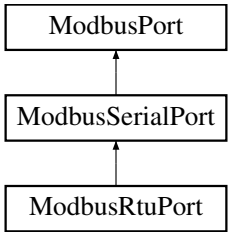
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusPort.h

7.12 ModbusRtuPort Class Reference

Implements RTU version of the Modbus communication protocol.

```
#include <ModbusRtuPort.h>
```

Inheritance diagram for ModbusRtuPort:



Public Member Functions

- ModbusRtuPort (bool blocking=false)
- ~ModbusRtuPort ()
- Modbus::ProtocolType type () const override

Public Member Functions inherited from ModbusSerialPort

- Modbus::Handle handle () const override
- Modbus::StatusCode open () override
- Modbus::StatusCode close () override
- bool isOpen () const override
- const Modbus::Char * portName () const
- void setPortName (const Modbus::Char *portName)
- int32_t baudRate () const
- void setBaudRate (int32_t baudRate)
- int8_t dataBits () const
- void setDataBits (int8_t dataBits)
- Modbus::Parity parity () const
- void setParity (Modbus::Parity parity)
- Modbus::StopBits stopBits () const
- void setStopBits (Modbus::StopBits stopBits)
- Modbus::FlowControl flowControl () const
- void setFlowControl (Modbus::FlowControl flowControl)
- uint32_t timeoutFirstByte () const
- void setTimeoutFirstByte (uint32_t timeout)
- uint32_t timeoutInterByte () const
- void setTimeoutInterByte (uint32_t timeout)
- const uint8_t * readBufferData () const override
- uint16_t readBufferSize () const override
- const uint8_t * writeBufferData () const override
- uint16_t writeBufferSize () const override

Public Member Functions inherited from ModbusPort

- virtual ~ModbusPort ()
- virtual void setNextRequestRepeated (bool v)
- bool isChanged () const
- bool isServerMode () const
- virtual void setServerMode (bool mode)
- bool isBlocking () const
- bool isNonBlocking () const
- Modbus::StatusCode lastErrorStatus () const
- const Modbus::Char * lastErrorText () const

Protected Member Functions

- Modbus::StatusCode writeBuffer (uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff) override
- Modbus::StatusCode readBuffer (uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t maxSzBuff, uint16_t *szOutBuff) override

Protected Member Functions inherited from ModbusSerialPort

- Modbus::StatusCode write () override
- Modbus::StatusCode read () override

Protected Member Functions inherited from ModbusPort

- Modbus::StatusCode setError (Modbus::StatusCode status, const Modbus::Char *text)

7.12.1 Detailed Description

Implements RTU version of the Modbus communication protocol.

`ModbusRtuPort` derived from `ModbusSerialPort` and implements `writeBuffer` and `readBuffer` for RTU version of Modbus communication protocol.

7.12.2 Constructor & Destructor Documentation

7.12.2.1 ModbusRtuPort()

```
ModbusRtuPort::ModbusRtuPort (
            bool blocking = false )
```

Constructor of the class. if `blocking = true` then defines blocking mode, non blocking otherwise.

7.12.2.2 ~ModbusRtuPort()

```
ModbusRtuPort::~ModbusRtuPort ( )
```

Destructor of the class.

7.12.3 Member Function Documentation

7.12.3.1 readBuffer()

```
Modbus::StatusCode ModbusRtuPort::readBuffer (
            uint8_t & unit,
            uint8_t & func,
            uint8_t * buff,
            uint16_t maxSzBuff,
            uint16_t * szOutBuff )  [override], [protected], [virtual]
```

The function parses the packet that the `read()` function puts into the buffer, checks it for correctness, extracts its parameters, and returns the status of the operation.

Implements ModbusPort.

7.12.3.2 type()

```
Modbus::ProtocolType ModbusRtuPort::type ( ) const  [inline], [override], [virtual]
```

Returns the Modbus protocol type. For `ModbusAscPort` returns `Modbus::RTU`.

Implements ModbusPort.

7.12.3.3 writeBuffer()

```
Modbus::StatusCode ModbusRtuPort::writeBuffer (
            uint8_t unit,
            uint8_t func,
            uint8_t * buff,
            uint16_t szInBuff )  [override], [protected], [virtual]
```

The function directly generates a packet and places it in the buffer for further sending. Returns the status of the operation.

Implements ModbusPort.

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

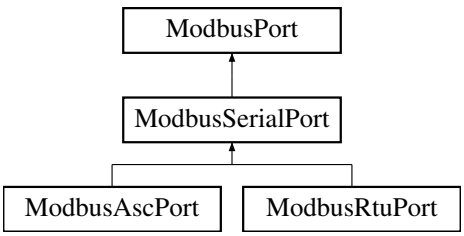
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusRtuPort.h

7.13 ModbusSerialPort Class Reference

The abstract class `ModbusSerialPort` is the base class serial port Modbus communications.

```
#include <ModbusSerialPort.h>
```

Inheritance diagram for ModbusSerialPort:



Classes

- struct Defaults

  Holds the default values of the settings.

Public Member Functions

- Modbus::Handle handle () const override
- Modbus::StatusCode open () override
- Modbus::StatusCode close () override
- bool isOpen () const override
- const Modbus::Char * portName () const
- void setPortName (const Modbus::Char *portName)
- int32_t baudRate () const
- void setBaudRate (int32_t baudRate)
- int8_t dataBits () const
- void setDataBits (int8_t dataBits)
- Modbus::Parity parity () const
- void setParity (Modbus::Parity parity)
- Modbus::StopBits stopBits () const
- void setStopBits (Modbus::StopBits stopBits)
- Modbus::FlowControl flowControl () const
- void setFlowControl (Modbus::FlowControl flowControl)
- uint32_t timeoutFirstByte () const
- void setTimeoutFirstByte (uint32_t timeout)
- uint32_t timeoutInterByte () const
- void setTimeoutInterByte (uint32_t timeout)
- const uint8_t * readBufferData () const override
- uint16_t readBufferSize () const override
- const uint8_t * writeBufferData () const override
- uint16_t writeBufferSize () const override

Public Member Functions inherited from ModbusPort

- virtual ~ModbusPort ()
- virtual Modbus::ProtocolType type () const =0
- virtual void setNextRequestRepeated (bool v)
- bool isChanged () const
- bool isServerMode () const
- virtual void setServerMode (bool mode)
- bool isBlocking () const
- bool isNonBlocking () const
- Modbus::StatusCode lastErrorStatus () const
- const Modbus::Char * lastErrorText () const
- virtual Modbus::StatusCode writeBuffer (uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff)=0
- virtual Modbus::StatusCode readBuffer (uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t maxSzBuff, uint16_t *szOutBuff)=0

Protected Member Functions

- Modbus::StatusCode write () override
- Modbus::StatusCode read () override

Protected Member Functions inherited from ModbusPort

- Modbus::StatusCode setError (Modbus::StatusCode status, const Modbus::Char *text)

7.13.1 Detailed Description

The abstract class `ModbusSerialPort` is the base class serial port Modbus communications.

The abstract class `ModbusSerialPort` is the base class for a specific implementation of the Modbus communication protocol that using Serial Port. It implements functions which are common for the serial port: `open`, `close`, `read` and `write`.

7.13.2 Member Function Documentation

7.13.2.1 baudRate()

```
int32_t ModbusSerialPort::baudRate ( ) const
```

Returns current serial port baud rate, e.g. 1200, 2400, 9600, 115200 etc.

7.13.2.2 close()

```
Modbus::StatusCode ModbusSerialPort::close ( )  [override], [virtual]
```

Close serial port and returns `Modbus::Status_Good`.

Implements ModbusPort.

7.13.2.3 dataBits()

```
int8_t ModbusSerialPort::dataBits ( ) const
```

Returns current serial port data bits, e.g. 5, 6, 7 or 8.

7.13.2.4 flowControl()

```
Modbus::FlowControl ModbusSerialPort::flowControl ( ) const
```

Returns current serial port `Modbus::FlowControl` enum value.

7.13.2.5 handle()

```
Modbus::Handle ModbusSerialPort::handle ( ) const  [override], [virtual]
```

Returns native OS serial port handle, e.g. `HANDLE` value for Windows.

Implements ModbusPort.

7.13.2.6 isOpen()

```
bool ModbusSerialPort::isOpen ( ) const  [override], [virtual]
```

Returns `true` if the serial port is open, `false` otherwise.

Implements ModbusPort.

7.13.2.7 open()

```
Modbus::StatusCode ModbusSerialPort::open ( )  [override], [virtual]
```

Try to open serial port and returns `Modbus::Status_Good` if success or `Modbus::Status_BadSerialOpen` otherwise.

Implements ModbusPort.

7.13.2.8 parity()

```
Modbus::Parity ModbusSerialPort::parity ( ) const
```

Returns current serial port `Modbus::Parity` enum value.

7.13.2.9 portName()

```
const Modbus::Char * ModbusSerialPort::portName ( ) const
```

Returns current serial port name, e.g. `COM1` for Windows or `/dev/ttyS0` for Unix.

7.13.2.10 read()

```
Modbus::StatusCode ModbusSerialPort::read ( )  [override], [protected], [virtual]
```

Implements the algorithm for reading from the port and returns the status of the operation.

Implements ModbusPort.

7.13.2.11 readBufferData()

```
const uint8_t * ModbusSerialPort::readBufferData ( ) const  [override], [virtual]
```

Returns pointer to data of read buffer.

Implements ModbusPort.

7.13.2.12 readBufferSize()

```
uint16_t ModbusSerialPort::readBufferSize ( ) const  [override], [virtual]
```

Returns size of data of read buffer.

Implements ModbusPort.

7.13.2.13 setBaudRate()

```
void ModbusSerialPort::setBaudRate (
            int32_t baudRate )
```

Set current serial port baud rate.

7.13.2.14 setDataBits()

```
void ModbusSerialPort::setDataBits (
            int8_t dataBits )
```

Set current serial port baud data bits.

7.13.2.15 setFlowControl()

```
void ModbusSerialPort::setFlowControl (
            Modbus::FlowControl flowControl )
```

Set current serial port `Modbus::FlowControl` enum value.

7.13.2.16 setParity()

```
void ModbusSerialPort::setParity (
            Modbus::Parity parity )
```

Set current serial port `Modbus::Parity` enum value.

7.13.2.17 setPortName()

```
void ModbusSerialPort::setPortName (
            const Modbus::Char * portName )
```

Set current serial port name.

7.13.2.18 setStopBits()

```
void ModbusSerialPort::setStopBits (
            Modbus::StopBits stopBits )
```

Set current serial port `Modbus::StopBits` enum value.

7.13.2.19 setTimeoutFirstByte()

```
void ModbusSerialPort::setTimeoutFirstByte (
            uint32_t timeout )
```

Set current serial port timeout of waiting first byte of incomming packet (in milliseconds).

7.13.2.20 setTimeoutInterByte()

```
void ModbusSerialPort::setTimeoutInterByte (
            uint32_t timeout )
```

Set current serial port timeout of waiting next byte (inter byte waiting tgimeout) of incomming packet (in milliseconds).

7.13.2.21 stopBits()

```
Modbus::StopBits ModbusSerialPort::stopBits ( ) const
```

Returns current serial port Modbus::StopBits enum value.

7.13.2.22 timeoutFirstByte()

```
uint32_t ModbusSerialPort::timeoutFirstByte ( ) const
```

Returns current serial port timeout of waiting first byte of incomming packet (in milliseconds).

7.13.2.23 timeoutInterByte()

```
uint32_t ModbusSerialPort::timeoutInterByte ( ) const
```

Returns current serial port timeout of waiting next byte (inter byte waiting tgimeout) of incomming packet (in milliseconds).

7.13.2.24 write()

```
Modbus::StatusCode ModbusSerialPort::write ( )  [override], [protected], [virtual]
```

Implements the algorithm for writing to the port and returns the status of the operation.

Implements ModbusPort.

7.13.2.25 writeBufferData()

```
const uint8_t * ModbusSerialPort::writeBufferData ( ) const  [override], [virtual]
```

Returns pointer to data of write buffer.

Implements ModbusPort.

7.13.2.26 writeBufferSize()

```
uint16_t ModbusSerialPort::writeBufferSize ( ) const  [override], [virtual]
```

Returns size of data of write buffer.

Implements ModbusPort.

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

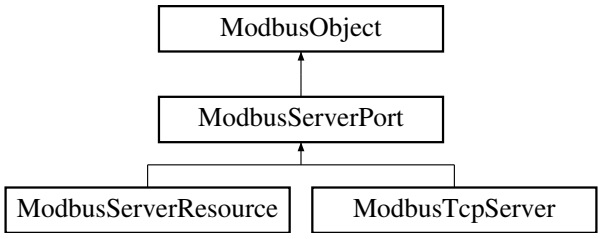
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusSerialPort.h

7.14 ModbusServerPort Class Reference

Abstract base class for direct control of `ModbusPort` derived classes (TCP or serial) for server side.

```
#include <ModbusServerPort.h>
```

Inheritance diagram for ModbusServerPort:



Public Member Functions

- ModbusInterface * device () const
- virtual Modbus::ProtocolType type () const =0
- virtual bool isTcpServer () const
- virtual Modbus::StatusCode open ()=0
- virtual Modbus::StatusCode close ()=0
- virtual bool isOpen () const =0
- virtual Modbus::StatusCode process ()=0
- bool isStateClosed () const
- void signalOpened (const Modbus::Char *source)
- void signalClosed (const Modbus::Char *source)
- void signalTx (const Modbus::Char *source, const uint8_t *buff, uint16_t size)
- void signalRx (const Modbus::Char *source, const uint8_t *buff, uint16_t size)
- void signalError (const Modbus::Char *source, Modbus::StatusCode status, const Modbus::Char *text)

Public Member Functions inherited from ModbusObject

- ModbusObject ()
- virtual ~ModbusObject ()
- const Modbus::Char * objectName () const
- void setObjectName (const Modbus::Char *name)
- template<class SignalClass , class T , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class SignalClass , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- template<class ReturnType , class ... Args>
  void disconnect (ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- void disconnectFunc (void *funcPtr)
- template<class T , class ReturnType , class ... Args>
  void disconnect (T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class T >
  void disconnect (T *object)

Protected Member Functions

- ModbusObject ()

Protected Member Functions inherited from ModbusObject

- template<class T , class ... Args>
  void emitSignal (const char *thisMethodId, ModbusMethodPointer< T, void, Args ... > thisMethod, Args ... args)

Additional Inherited Members

Static Public Member Functions inherited from ModbusObject

- static ModbusObject * sender ()

7.14.1 Detailed Description

Abstract base class for direct control of `ModbusPort` derived classes (TCP or serial) for server side.

Pointer to `ModbusPort` object must be passed to `ModbusServerPort` derived class constructor.

Also assumed that `ModbusServerPort` derived classes must accept `ModbusInterface` object in its constructor to process every Modbus function request.

7.14.2 Member Function Documentation

7.14.2.1 close()

```
virtual Modbus::StatusCode ModbusServerPort::close ( )  [pure virtual]
```

Closes port/connection and returns status of the operation.

Implemented in ModbusServerResource, and ModbusTcpServer.

7.14.2.2 device()

```
ModbusInterface * ModbusServerPort::device ( ) const
```

Returns pointer to `ModbusInterface` object/device that was previously passed in constructor. This device must process every input Modbus function request for this server port

7.14.2.3 isOpen()

```
virtual bool ModbusServerPort::isOpen ( ) const  [pure virtual]
```

Returns `true` if inner port is open, `false` otherwise.

Implemented in ModbusServerResource, and ModbusTcpServer.

7.14.2.4 isStateClosed()

```
bool ModbusServerPort::isStateClosed ( ) const
```

Returns `true` if current port has closed inner state, `false` otherwise.

7.14.2.5 isTcpServer()

```
virtual bool ModbusServerPort::isTcpServer ( ) const  [virtual]
```

Returns `true` if current server port is TCP server, `false` otherwise.

Reimplemented in ModbusTcpServer.

7.14.2.6 ModbusObject()

```
ModbusObject::ModbusObject ( )  [protected]
```

Constructor of the class.

7.14.2.7 open()

```
virtual Modbus::StatusCode ModbusServerPort::open ( )  [pure virtual]
```

Open inner port/connection to begin working and returns status of the operation. User do not need to call this method directly.

Implemented in ModbusServerResource, and ModbusTcpServer.

7.14.2.8 process()

```
virtual Modbus::StatusCode ModbusServerPort::process ( )  [pure virtual]
```

Main function of the class. Must be called in the cycle. Return statuc code is not very useful but can indicate that inner server operations are good, bad or in process.

Implemented in ModbusServerResource, and ModbusTcpServer.

7.14.2.9 signalClosed()

```
void ModbusServerPort::signalClosed (
            const Modbus::Char * source )
```

Signal occured when inner port was closed. `source` - current port name.

7.14.2.10 signalError()

```
void ModbusServerPort::signalError (
            const Modbus::Char * source,
            Modbus::StatusCode status,
            const Modbus::Char * text )
```

Signal occured when error is occured with error's `status` and `text`. `source` - current port name.

7.14.2.11 signalOpened()

```
void ModbusServerPort::signalOpened (
            const Modbus::Char * source )
```

Signal occured when inner port was opened. `source` - current port name.

7.14.2.12 signalRx()

```
void ModbusServerPort::signalRx (
            const Modbus::Char * source,
            const uint8_t * buff,
            uint16_t size )
```

Signal occured when the incoming packet 'Rx' from the internal list of callbacks, passing them the input array 'buff' and its size 'size'. `source` - current port name.

7.14.2.13 signalTx()

```
void ModbusServerPort::signalTx (
            const Modbus::Char * source,
            const uint8_t * buff,
            uint16_t size )
```

Signal occured when the original packet 'Tx' from the internal list of callbacks, passing them the original array 'buff' and its size 'size'. `source` - current port name.

7.14.2.14 type()

```
virtual Modbus::ProtocolType ModbusServerPort::type ( ) const  [pure virtual]
```

Returns type of Modbus protocol.

Implemented in ModbusServerResource, and ModbusTcpServer.

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

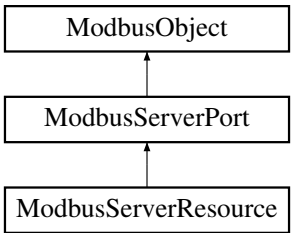
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusServerPort.h

7.15 ModbusServerResource Class Reference

Implements direct control for `ModbusPort` derived classes (TCP or serial) for server side.

```
#include <ModbusServerResource.h>
```

Inheritance diagram for ModbusServerResource:



Public Member Functions

- ModbusServerResource (ModbusPort *port, ModbusInterface *device)
- ModbusPort * port () const
- Modbus::ProtocolType type () const override
- Modbus::StatusCode open () override
- Modbus::StatusCode close () override
- bool isOpen () const override
- Modbus::StatusCode process () override

Public Member Functions inherited from ModbusServerPort

- ModbusInterface * device () const
- virtual bool isTcpServer () const
- bool isStateClosed () const
- void signalOpened (const Modbus::Char *source)
- void signalClosed (const Modbus::Char *source)
- void signalTx (const Modbus::Char *source, const uint8_t *buff, uint16_t size)
- void signalRx (const Modbus::Char *source, const uint8_t *buff, uint16_t size)
- void signalError (const Modbus::Char *source, Modbus::StatusCode status, const Modbus::Char *text)

Public Member Functions inherited from ModbusObject

- ModbusObject ()
- virtual ~ModbusObject ()
- const Modbus::Char * objectName () const
- void setObjectName (const Modbus::Char *name)
- template<class SignalClass , class T , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class SignalClass , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- template<class ReturnType , class ... Args>
  void disconnect (ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- void disconnectFunc (void *funcPtr)
- template<class T , class ReturnType , class ... Args>
  void disconnect (T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class T >
  void disconnect (T *object)

Protected Member Functions

- virtual Modbus::StatusCode processInputData (const uint8_t *buff, uint16_t sz)
- virtual Modbus::StatusCode processDevice ()
- virtual Modbus::StatusCode processOutputData (uint8_t *buff, uint16_t &sz)

Protected Member Functions inherited from ModbusServerPort

- ModbusObject ()

Protected Member Functions inherited from ModbusObject

- template<class T , class ... Args>
  void emitSignal (const char *thisMethodId, ModbusMethodPointer< T, void, Args ... > thisMethod, Args ... args)

Additional Inherited Members

Static Public Member Functions inherited from ModbusObject

- static ModbusObject * sender ()

7.15.1 Detailed Description

Implements direct control for `ModbusPort` derived classes (TCP or serial) for server side.

`ModbusServerResource` derived from `ModbusServerPort` and makes `ModbusPort` object behaves like server port. Pointer to `ModbusPort` object is passed to `ModbusServerResource` constructor.

Also `ModbusServerResource` have `ModbusInterface` object as second parameter of constructor which process every Modbus function request.

7.15.2 Constructor & Destructor Documentation

7.15.2.1 ModbusServerResource()

```
ModbusServerResource::ModbusServerResource (
            ModbusPort * port,
            ModbusInterface * device )
```

Constructor of the class.

Parameters

in	*port*	Pointer to the ModbusPort which is managed by the current class object.
in	*device*	Pointer to the ModbusInterface implementation to which all requests for Modbus functions are forwarded.

7.15.3 Member Function Documentation

7.15.3.1 close()

```
Modbus::StatusCode ModbusServerResource::close ( )  [override], [virtual]
```

Closes port/connection and returns status of the operation.

Implements ModbusServerPort.

7.15.3.2 isOpen()

```
bool ModbusServerResource::isOpen ( ) const  [override], [virtual]
```

Returns `true` if inner port is open, `false` otherwise.

Implements ModbusServerPort.

7.15.3.3 open()

```
Modbus::StatusCode ModbusServerResource::open ( )  [override], [virtual]
```

Open inner port/connection to begin working and returns status of the operation. User do not need to call this method directly.

Implements ModbusServerPort.

7.15.3.4 port()

```
ModbusPort * ModbusServerResource::port ( ) const
```

Returns pointer to inner port which was previously passed in constructor.

7.15.3.5 process()

```
Modbus::StatusCode ModbusServerResource::process ( )  [override], [virtual]
```

Main function of the class. Must be called in the cycle. Return statuc code is not very useful but can indicate that inner server operations are good, bad or in process.

Implements ModbusServerPort.

7.15.3.6 processDevice()

```
virtual Modbus::StatusCode ModbusServerResource::processDevice ( )  [protected], [virtual]
```

Transfer input request Modbus function to inner device and returns status of the operation.

7.15.3.7 processInputData()

```
virtual Modbus::StatusCode ModbusServerResource::processInputData (
            const uint8_t * buff,
            uint16_t sz )  [protected], [virtual]
```

Process input data `buff` with `size` and returns status of the operation.

7.15.3.8 processOutputData()

```
virtual Modbus::StatusCode ModbusServerResource::processOutputData (
            uint8_t * buff,
            uint16_t & sz )  [protected], [virtual]
```

Process output data `buff` with `size` and returns status of the operation.

7.15.3.9 type()

```
Modbus::ProtocolType ModbusServerResource::type ( ) const  [override], [virtual]
```

Returns type of Modbus protocol. Same as `port()->type()`.

Implements ModbusServerPort.

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusServerResource.h

7.16 ModbusSlotBase< ReturnType, Args > Class Template Reference

`ModbusSlotBase` base template for slot (method or function)

`#include <ModbusObject.h>`

Public Member Functions

- virtual ~ModbusSlotBase ()
- virtual void * object () const
- virtual void * methodOrFunction () const =0
- virtual ReturnType exec (Args ... args)=0

7.16.1 Detailed Description

template<class ReturnType, class ... Args>
class ModbusSlotBase< ReturnType, Args >

`ModbusSlotBase` base template for slot (method or function)

7.16.2 Constructor & Destructor Documentation

7.16.2.1 ~ModbusSlotBase()

```
template<class ReturnType , class ...  Args>
virtual ModbusSlotBase< ReturnType, Args >::~ModbusSlotBase ( )  [inline], [virtual]
```

Virtual destructor of the class

7.16.3 Member Function Documentation

7.16.3.1 exec()

```
template<class ReturnType , class ...  Args>
virtual ReturnType ModbusSlotBase< ReturnType, Args >::exec (
            Args ...  args )  [pure virtual]
```

Execute method or function slot

Implemented in ModbusSlotMethod< T, ReturnType, Args >, and ModbusSlotFunction< ReturnType, Args >.

7.16.3.2 methodOrFunction()

```
template<class ReturnType , class ...  Args>
virtual void * ModbusSlotBase< ReturnType, Args >::methodOrFunction ( ) const  [pure virtual]
```

Return pointer to method (in case of method slot) or function (in case of function slot)

Implemented in ModbusSlotMethod< T, ReturnType, Args >, and ModbusSlotFunction< ReturnType, Args >.

7.16.3.3 object()

```
template<class ReturnType , class ...  Args>
virtual void * ModbusSlotBase< ReturnType, Args >::object ( ) const  [inline], [virtual]
```

Return pointer to object which method belongs to (in case of method slot) or `nullptr` in case of function slot

Reimplemented in ModbusSlotMethod< T, ReturnType, Args >.

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

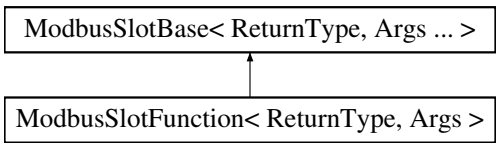
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusObject.h

7.17 ModbusSlotFunction< ReturnType, Args > Class Template Reference

`ModbusSlotFunction` template class hold pointer to slot function

`#include <ModbusObject.h>`

Inheritance diagram for ModbusSlotFunction< ReturnType, Args >:



Public Member Functions

- ModbusSlotFunction (ModbusFunctionPointer< ReturnType, Args... > funcPtr)
- void * methodOrFunction () const override
- ReturnType exec (Args ... args) override

Public Member Functions inherited from ModbusSlotBase< ReturnType, Args ... >

- virtual ~ModbusSlotBase ()
- virtual void * object () const

7.17.1 Detailed Description

template<class ReturnType, class ... Args>
class ModbusSlotFunction< ReturnType, Args >

`ModbusSlotFunction` template class hold pointer to slot function

7.17.2 Constructor & Destructor Documentation

7.17.2.1 ModbusSlotFunction()

```
template<class ReturnType , class ...  Args>
ModbusSlotFunction< ReturnType, Args >::ModbusSlotFunction (
            ModbusFunctionPointer< ReturnType, Args...  > funcPtr )  [inline]
```

Constructor of the slot.

Parameters

in	*funcPtr*	Pointer to slot function.

7.17.3 Member Function Documentation

7.17.3.1 exec()

```
template<class ReturnType , class ...  Args>
ReturnType ModbusSlotFunction< ReturnType, Args >::exec (
            Args ...  args )  [inline], [override], [virtual]
```

Execute method or function slot

Implements ModbusSlotBase< ReturnType, Args ... >.

7.17.3.2 methodOrFunction()

```
template<class ReturnType , class ...  Args>
void * ModbusSlotFunction< ReturnType, Args >::methodOrFunction ( ) const  [inline], [override],
[virtual]
```

Return pointer to method (in case of method slot) or function (in case of function slot)

Implements ModbusSlotBase< ReturnType, Args ... >.

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

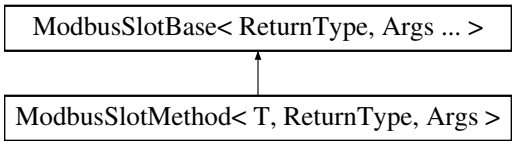
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusObject.h

7.18 ModbusSlotMethod< T, ReturnType, Args > Class Template Reference

`ModbusSlotMethod` template class hold pointer to object and its method

```
#include <ModbusObject.h>
```

Inheritance diagram for ModbusSlotMethod< T, ReturnType, Args >:



Public Member Functions

- ModbusSlotMethod (T *object, ModbusMethodPointer< T, ReturnType, Args... > methodPtr)
- void * object () const override
- void * methodOrFunction () const override
- ReturnType exec (Args ... args) override

Public Member Functions inherited from ModbusSlotBase< ReturnType, Args ... >

- virtual ~ModbusSlotBase ()

7.18.1 Detailed Description

template<class T, class ReturnType, class ... Args>
class ModbusSlotMethod< T, ReturnType, Args >

`ModbusSlotMethod` template class hold pointer to object and its method

7.18.2 Constructor & Destructor Documentation

7.18.2.1 ModbusSlotMethod()

```
template<class T , class ReturnType , class ...  Args>
ModbusSlotMethod< T, ReturnType, Args >::ModbusSlotMethod (
            T * object,
            ModbusMethodPointer< T, ReturnType, Args...  > methodPtr )  [inline]
```

Constructor of the slot.

Parameters

in	*object*	Pointer to object.
in	*methodPtr*	Pointer to object's method.

7.18.3 Member Function Documentation

7.18.3.1 exec()

```
template<class T , class ReturnType , class ...  Args>
ReturnType ModbusSlotMethod< T, ReturnType, Args >::exec (
            Args ...  args )  [inline], [override], [virtual]
```

Execute method or function slot

Implements ModbusSlotBase< ReturnType, Args ... >.

7.18.3.2 methodOrFunction()

```
template<class T , class ReturnType , class ... Args>
void * ModbusSlotMethod< T, ReturnType, Args >::methodOrFunction ( ) const [inline], [override],
[virtual]
```

Return pointer to method (in case of method slot) or function (in case of function slot)

Implements ModbusSlotBase< ReturnType, Args ... >.

7.18.3.3 object()

```
template<class T , class ReturnType , class ... Args>
void * ModbusSlotMethod< T, ReturnType, Args >::object ( ) const [inline], [override], [virtual]
```

Return pointer to object which method belongs to (in case of method slot) or `nullptr` in case of function slot

Reimplemented from ModbusSlotBase< ReturnType, Args ... >.

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

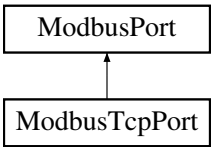
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusObject.h

7.19 ModbusTcpPort Class Reference

Class `ModbusTcpPort` implements TCP version of Modbus protocol.

```
#include <ModbusTcpPort.h>
```

Inheritance diagram for ModbusTcpPort:



Classes

- struct Defaults

  `Defaults` class constain default settings values for `ModbusTcpPort`.

Public Member Functions

- ModbusTcpPort (ModbusTcpSocket *socket, bool blocking=false)
- ModbusTcpPort (bool blocking=false)
- Modbus::ProtocolType type () const override
- Modbus::Handle handle () const override
- Modbus::StatusCode open () override
- Modbus::StatusCode close () override
- bool isOpen () const override
- const Modbus::Char * host () const
- void setHost (const Modbus::Char *host)
- uint16_t port () const
- void setPort (uint16_t port)
- uint32_t timeout () const
- void setTimeout (uint32_t timeout)
- void setNextRequestRepeated (bool v) override
- bool autoIncrement () const
- const uint8_t * readBufferData () const override
- uint16_t readBufferSize () const override
- const uint8_t * writeBufferData () const override
- uint16_t writeBufferSize () const override

Public Member Functions inherited from ModbusPort

- virtual ~ModbusPort ()
- bool isChanged () const
- bool isServerMode () const
- virtual void setServerMode (bool mode)
- bool isBlocking () const
- bool isNonBlocking () const
- Modbus::StatusCode lastErrorStatus () const
- const Modbus::Char * lastErrorText () const

Protected Member Functions

- Modbus::StatusCode write () override
- Modbus::StatusCode read () override
- Modbus::StatusCode writeBuffer (uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff) override
- Modbus::StatusCode readBuffer (uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t maxSzBuff, uint16_t *szOutBuff) override

Protected Member Functions inherited from ModbusPort

- Modbus::StatusCode setError (Modbus::StatusCode status, const Modbus::Char *text)

7.19.1 Detailed Description

Class `ModbusTcpPort` implements TCP version of Modbus protocol.

`ModbusPort` contains function to work with TCP-port (connection).

7.19.2 Constructor & Destructor Documentation

7.19.2.1 ModbusTcpPort() [1/2]

```
ModbusTcpPort::ModbusTcpPort (
            ModbusTcpSocket * socket,
            bool blocking = false )
```

Constructor of the class.

7.19.2.2 ModbusTcpPort() [2/2]

```
ModbusTcpPort::ModbusTcpPort (
            bool blocking = false )
```

Constructor of the class.

7.19.3 Member Function Documentation

7.19.3.1 autoIncrement()

```
bool ModbusTcpPort::autoIncrement ( ) const
```

Returns 'true' if the identifier of each subsequent parcel is automatically incremented by 1, 'false' otherwise.

7.19.3.2 close()

```
Modbus::StatusCode ModbusTcpPort::close ( )  [override], [virtual]
```

Closes the port (breaks the connection) and returns the status the result status.

Implements ModbusPort.

7.19.3.3 handle()

```
Modbus::Handle ModbusTcpPort::handle ( ) const  [override], [virtual]
```

Native OS handle for the socket.

Implements ModbusPort.

7.19.3.4 host()

```
const Modbus::Char * ModbusTcpPort::host ( ) const
```

Returns the settings for the IP address or DNS name of the remote device.

7.19.3.5 isOpen()

```
bool ModbusTcpPort::isOpen ( ) const  [override], [virtual]
```

Returns `true` if the port is open/communication with the remote device is established, `false` otherwise.

Implements ModbusPort.

7.19.3.6 open()

```
Modbus::StatusCode ModbusTcpPort::open ( )  [override], [virtual]
```

Opens port (create connection) for further operations and returns the result status.

Implements ModbusPort.

7.19.3.7 port()

```
uint16_t ModbusTcpPort::port ( ) const
```

Returns the setting for the TCP port number of the remote device.

7.19.3.8 read()

```
Modbus::StatusCode ModbusTcpPort::read ( )  [override], [protected], [virtual]
```

Implements the algorithm for reading from the port and returns the status of the operation.

Implements ModbusPort.

7.19.3.9 readBuffer()

```
Modbus::StatusCode ModbusTcpPort::readBuffer (
            uint8_t & unit,
            uint8_t & func,
            uint8_t * buff,
            uint16_t maxSzBuff,
            uint16_t * szOutBuff )  [override], [protected], [virtual]
```

The function parses the packet that the `read()` function puts into the buffer, checks it for correctness, extracts its parameters, and returns the status of the operation.

Implements ModbusPort.

7.19.3.10 readBufferData()

```
const uint8_t * ModbusTcpPort::readBufferData ( ) const  [override], [virtual]
```

Returns pointer to data of read buffer.

Implements ModbusPort.

7.19.3.11 readBufferSize()

```
uint16_t ModbusTcpPort::readBufferSize ( ) const  [override], [virtual]
```

Returns size of data of read buffer.

Implements ModbusPort.

7.19.3.12 setHost()

```
void ModbusTcpPort::setHost (
            const Modbus::Char * host )
```

Sets the settings for the IP address or DNS name of the remote device.

7.19.3.13 setNextRequestRepeated()

```
void ModbusTcpPort::setNextRequestRepeated (
            bool v )  [override], [virtual]
```

For the TCP version of the Modbus protocol. The identifier of each subsequent parcel is automatically increased by 1. If you set `setNextRequestRepeated(true)` then the next ID will not be increased by 1 but for only one next parcel.

Reimplemented from ModbusPort.

7.19.3.14 setPort()

```
void ModbusTcpPort::setPort (
            uint16_t port )
```

Sets the settings for the TCP port number of the remote device.

7.19.3.15 setTimeout()

```
void ModbusTcpPort::setTimeout (
            uint32_t timeout )
```

Sets the setting for the connection timeout of the remote device.

7.19.3.16 timeout()

```
uint32_t ModbusTcpPort::timeout ( ) const
```

Returns the setting for the connection timeout of the remote device.

7.19.3.17 type()

```
Modbus::ProtocolType ModbusTcpPort::type ( ) const  [inline], [override], [virtual]
```

Returns the Modbus protocol type. In this case it is `Modbus::TCP`.

Implements ModbusPort.

7.19.3.18 write()

```
Modbus::StatusCode ModbusTcpPort::write ( )  [override], [protected], [virtual]
```

Implements the algorithm for writing to the port and returns the status of the operation.

Implements ModbusPort.

7.19.3.19 writeBuffer()

```
Modbus::StatusCode ModbusTcpPort::writeBuffer (
            uint8_t unit,
            uint8_t func,
            uint8_t * buff,
            uint16_t szInBuff )  [override], [protected], [virtual]
```

The function directly generates a packet and places it in the buffer for further sending. Returns the status of the operation.

Implements ModbusPort.

7.19.3.20 writeBufferData()

```
const uint8_t * ModbusTcpPort::writeBufferData ( ) const  [override], [virtual]
```

Returns pointer to data of write buffer.

Implements ModbusPort.

7.19.3.21 writeBufferSize()

```
uint16_t ModbusTcpPort::writeBufferSize ( ) const  [override], [virtual]
```

Returns size of data of write buffer.

Implements ModbusPort.

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

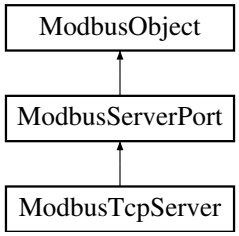
- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusTcpPort.h

7.20 ModbusTcpServer Class Reference

The `ModbusTcpServer` class implements TCP server part of the Modbus protocol.

`#include <ModbusTcpServer.h>`

Inheritance diagram for ModbusTcpServer:



Classes

- struct Defaults

  `Defaults` class constain default settings values for `ModbusTcpServer`.

Public Member Functions

- ModbusTcpServer (ModbusInterface *device)
- uint16_t port () const
- void setPort (uint16_t port)
- int timeout () const
- void setTimeout (int timeout)
- Modbus::ProtocolType type () const override
- bool isTcpServer () const override
- Modbus::StatusCode open () override
- Modbus::StatusCode close () override
- bool isOpen () const override
- Modbus::StatusCode process () override
- virtual ModbusServerPort * createTcpPort (ModbusTcpSocket *socket)
- void signalNewConnection (const Modbus::Char *source)
- void signalCloseConnection (const Modbus::Char *source)

Public Member Functions inherited from ModbusServerPort

- ModbusInterface * device () const
- bool isStateClosed () const
- void signalOpened (const Modbus::Char *source)
- void signalClosed (const Modbus::Char *source)
- void signalTx (const Modbus::Char *source, const uint8_t *buff, uint16_t size)
- void signalRx (const Modbus::Char *source, const uint8_t *buff, uint16_t size)
- void signalError (const Modbus::Char *source, Modbus::StatusCode status, const Modbus::Char *text)

Public Member Functions inherited from ModbusObject

- ModbusObject ()
- virtual ~ModbusObject ()
- const Modbus::Char * objectName () const
- void setObjectName (const Modbus::Char *name)
- template<class SignalClass , class T , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class SignalClass , class ReturnType , class ... Args>
  void connect (ModbusMethodPointer< SignalClass, ReturnType, Args ... > signalMethodPtr, ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- template<class ReturnType , class ... Args>
  void disconnect (ModbusFunctionPointer< ReturnType, Args ... > funcPtr)
- void disconnectFunc (void *funcPtr)
- template<class T , class ReturnType , class ... Args>
  void disconnect (T *object, ModbusMethodPointer< T, ReturnType, Args ... > objectMethodPtr)
- template<class T >
  void disconnect (T *object)

Protected Member Functions

- ModbusTcpSocket * nextPendingConnection ()
- void clearConnections ()

Protected Member Functions inherited from ModbusServerPort

- ModbusObject ()

Protected Member Functions inherited from ModbusObject

- template<class T , class ... Args>
  void emitSignal (const char *thisMethodId, ModbusMethodPointer< T, void, Args ... > thisMethod, Args ... args)

Additional Inherited Members

Static Public Member Functions inherited from ModbusObject

- static ModbusObject * sender ()

7.20.1 Detailed Description

The `ModbusTcpServer` class implements TCP server part of the Modbus protocol.

`ModbusTcpServer` ...

7.20.2 Constructor & Destructor Documentation

7.20.2.1 ModbusTcpServer()

```
ModbusTcpServer::ModbusTcpServer (
            ModbusInterface * device )
```

Constructor of the class. `device` param is object which might process incoming requests for read/write memory.

7.20.3 Member Function Documentation

7.20.3.1 clearConnections()

```
void ModbusTcpServer::clearConnections ( )  [protected]
```

Clear all allocated memory for previously established connections.

7.20.3.2 close()

```
Modbus::StatusCode ModbusTcpServer::close ( )  [override], [virtual]
```

Stop listening for incoming connections and close all previously opened connections.

Returns

- `Modbus::Status_Good` on success
- `Modbus::Status_Processing` when operation is not complete

Implements ModbusServerPort.

7.20.3.3 createTcpPort()

```
virtual ModbusServerPort * ModbusTcpServer::createTcpPort (
            ModbusTcpSocket * socket )  [virtual]
```

Creates `ModbusServerPort` for new incoming connection defined by `ModbusTcpSocket` pointer/

7.20.3.4 isOpen()

```
bool ModbusTcpServer::isOpen ( ) const  [override], [virtual]
```

Returns `true` if the server is currently listening for incoming connections, `false` otherwise.

Implements ModbusServerPort.

7.20.3.5 isTcpServer()

```
bool ModbusTcpServer::isTcpServer ( ) const  [inline], [override], [virtual]
```

Returns `true`.

Reimplemented from ModbusServerPort.

7.20.3.6 nextPendingConnection()

```
ModbusTcpSocket * ModbusTcpServer::nextPendingConnection ( )  [protected]
```

Checks for incoming connections and returns pointer `ModbusTcpSocket` if new connection established, `nullptr` otherwise.

7.20.3.7 open()

```
Modbus::StatusCode ModbusTcpServer::open ( )  [override], [virtual]
```

Try to listen for incoming connections on TCP port that was previously set (`port()`).

Returns

- `Modbus::Status_Good` on success
- `Modbus::Status_Processing` when operation is not complete
- `Modbus::Status_BadTcpCreate` when can't create TCP socket
- `Modbus::Status_BadTcpBind` when can't bind TCP socket
- `Modbus::Status_BadTcpListen` when can't listen TCP socket

Implements ModbusServerPort.

7.20.3.8 port()

```
uint16_t ModbusTcpServer::port ( ) const
```

Returns the setting for the TCP port number of the server.

7.20.3.9 process()

```
Modbus::StatusCode ModbusTcpServer::process ( )  [override], [virtual]
```

Main function of TCP server. Must be called in cycle to perform all incoming TCP connections.

Implements ModbusServerPort.

7.20.3.10 setPort()

```
void ModbusTcpServer::setPort (
            uint16_t port )
```

Sets the settings for the TCP port number of the server.

7.20.3.11 setTimeout()

```
void ModbusTcpServer::setTimeout (
            int timeout )
```

Sets the setting for the read timeout of every single conncetion.

7.20.3.12 signalCloseConnection()

```
void ModbusTcpServer::signalCloseConnection (
            const Modbus::Char * source )
```

Signal occured when TCP connection was closed. `source` - name of the current connection.

7.20.3.13 signalNewConnection()

```
void ModbusTcpServer::signalNewConnection (
            const Modbus::Char * source )
```

Signal occured when new TCP connection was accepted. `source` - name of the current connection.

7.20.3.14 timeout()

```
int ModbusTcpServer::timeout ( ) const
```

Returns the setting for the read timeout of every single conncetion.

7.20.3.15 type()

```
Modbus::ProtocolType ModbusTcpServer::type ( ) const  [inline], [override], [virtual]
```

Returns the Modbus protocol type. In this case it is `Modbus::TCP`.

Implements ModbusServerPort.

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusTcpServer.h

7.21 Modbus::SerialSettings Struct Reference

Struct to define settings for Serial Port.

`#include <ModbusGlobal.h>`

Public Attributes

- const Char * **portName**
  Value for the serial port name.
- int32_t **baudRate**
  Value for the serial port's baud rate.
- int8_t **dataBits**
  Value for the serial port's data bits.
- Parity **parity**
  Value for the serial port's patiry.
- StopBits **stopBits**
  Value for the serial port's stop bits.
- FlowControl **flowControl**
  Value for the serial port's flow control.
- uint32_t **timeoutFirstByte**
  Value for the serial port's timeout waiting first byte of packet.
- uint32_t **timeoutInterByte**
  Value for the serial port's timeout waiting next byte of packet.

7.21.1 Detailed Description

Struct to define settings for Serial Port.

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusGlobal.h

7.22 Modbus::Strings Class Reference

Sets constant key values for the map of settings.

`#include <ModbusQt.h>`

Public Member Functions

- Strings ()

Static Public Member Functions

- static const Strings & instance ()

Public Attributes

- const QString **unit**
  Setting key for the unit number of remote device.
- const QString **type**
  Setting key for the type of Modbus protocol.
- const QString **host**
  Setting key for the IP address or DNS name of the remote device.
- const QString **port**
  Setting key for the TCP port number of the remote device.
- const QString **timeout**
  Setting key for connection timeout (milliseconds)
- const QString **serialPortName**
  Setting key for the serial port name.
- const QString **baudRate**
  Setting key for the serial port's baud rate.
- const QString **dataBits**
  Setting key for the serial port's data bits.
- const QString **parity**
  Setting key for the serial port's patiry.
- const QString **stopBits**
  Setting key for the serial port's stop bits.
- const QString **flowControl**
  Setting key for the serial port's flow control.
- const QString **timeoutFirstByte**
  Setting key for the serial port's timeout waiting first byte of packet.
- const QString **timeoutInterByte**
  Setting key for the serial port's timeout waiting next byte of packet.

7.22.1 Detailed Description

Sets constant key values for the map of settings.

7.22.2 Constructor & Destructor Documentation

7.22.2.1 Strings()

```
Modbus::Strings::Strings ( )
```

Constructor ot the class.

7.22.3 Member Function Documentation

7.22.3.1 instance()

```
static const Strings & Modbus::Strings::instance ( )  [static]
```

Returns a reference to the global `Modbus::Strings` object.

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusQt.h

7.23 Modbus::TcpSettings Struct Reference

Struct to define settings for TCP connection.

`#include <ModbusGlobal.h>`

Public Attributes

- const Char * **host**

  Value for the IP address or DNS name of the remote device.
- uint16_t **port**

  Value for the TCP port number of the remote device.
- uint16_t **timeout**

  Value for connection timeout (milliseconds)

7.23.1 Detailed Description

Struct to define settings for TCP connection.

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

- c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusGlobal.h

Chapter 8

File Documentation

8.1 c:/Users/march/Dropbox/PRJ/ModbusLib/src/cModbus.h File Reference

Contains library interface for C language.

```
#include <stdbool.h>
#include "ModbusGlobal.h"
```

Typedefs

- typedef ModbusPort * **cModbusPort**

  Handle (pointer) of `ModbusPort` for C interface.
- typedef ModbusClientPort * **cModbusClientPort**

  Handle (pointer) of `ModbusClientPort` for C interface.
- typedef ModbusClient * **cModbusClient**

  Handle (pointer) of `ModbusClient` for C interface.
- typedef ModbusServerPort * **cModbusServerPort**

  Handle (pointer) of `ModbusServerPort` for C interface.
- typedef ModbusInterface * **cModbusInterface**

  Handle (pointer) of `ModbusInterface` for C interface.
- typedef void * **cModbusDevice**

  Handle (pointer) of `ModbusDevice` for C interface.
- typedef StatusCode(* pfReadCoils) (cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t count, void *values)
- typedef StatusCode(* pfReadDiscreteInputs) (cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t count, void *values)
- typedef StatusCode(* pfReadHoldingRegisters) (cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t count, uint16_t *values)
- typedef StatusCode(* pfReadInputRegisters) (cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t count, uint16_t *values)
- typedef StatusCode(* pfWriteSingleCoil) (cModbusDevice dev, uint8_t unit, uint16_t offset, bool value)
- typedef StatusCode(* pfWriteSingleRegister) (cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t value)
- typedef StatusCode(* pfReadExceptionStatus) (cModbusDevice dev, uint8_t unit, uint8_t *status)

- typedef StatusCode(∗ pfWriteMultipleCoils) (cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t count, const void ∗values)
- typedef StatusCode(∗ pfWriteMultipleRegisters) (cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t count, const uint16_t ∗values)
- typedef void(∗ pfSlotOpened) (const Char ∗source)
- typedef void(∗ pfSlotClosed) (const Char ∗source)
- typedef void(∗ pfSlotTx) (const Char ∗source, const uint8_t ∗buff, uint16_t size)
- typedef void(∗ pfSlotRx) (const Char ∗source, const uint8_t ∗buff, uint16_t size)
- typedef void(∗ pfSlotError) (const Char ∗source, StatusCode status, const Char ∗text)
- typedef void(∗ pfSlotNewConnection) (const Char ∗source)
- typedef void(∗ pfSlotCloseConnection) (const Char ∗source)

Functions

- MODBUS_EXPORT cModbusInterface cCreateModbusDevice (cModbusDevice device, pfReadCoils readCoils, pfReadDiscreteInputs readDiscreteInputs, pfReadHoldingRegisters readHoldingRegisters, pfReadInputRegisters readInputRegisters, pfWriteSingleCoil writeSingleCoil, pfWriteSingleRegister writeSingleRegister, pfReadExceptionStatus readExceptionStatus, pfWriteMultipleCoils writeMultipleCoils, pfWriteMultipleRegisters writeMultipleRegisters)
- MODBUS_EXPORT void cDeleteModbusDevice (cModbusInterface dev)
- MODBUS_EXPORT cModbusPort cPortCreate (ProtocolType type, const void ∗settings, bool blocking)
- MODBUS_EXPORT void cPortDelete (cModbusPort port)
- MODBUS_EXPORT cModbusClientPort cCpoCreate (ProtocolType type, const void ∗settings, bool blocking)
- MODBUS_EXPORT cModbusClientPort cCpoCreateForPort (cModbusPort port)
- MODBUS_EXPORT void cCpoDelete (cModbusClientPort clientPort)
- MODBUS_EXPORT const Char ∗ cCpoGetObjectName (cModbusClientPort clientPort)
- MODBUS_EXPORT void cCpoSetObjectName (cModbusClientPort clientPort, const Char ∗name)
- MODBUS_EXPORT ProtocolType cCpoGetType (cModbusClientPort clientPort)
- MODBUS_EXPORT bool cCpoIsOpen (cModbusClientPort clientPort)
- MODBUS_EXPORT bool cCpoClose (cModbusClientPort clientPort)
- MODBUS_EXPORT uint32_t cCpoGetRepeatCount (cModbusClientPort clientPort)
- MODBUS_EXPORT void cCpoSetRepeatCount (cModbusClientPort clientPort, uint32_t count)
- MODBUS_EXPORT StatusCode cCpoReadCoils (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, void ∗values)
- MODBUS_EXPORT StatusCode cCpoReadDiscreteInputs (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, void ∗values)
- MODBUS_EXPORT StatusCode cCpoReadHoldingRegisters (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, uint16_t ∗values)
- MODBUS_EXPORT StatusCode cCpoReadInputRegisters (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, uint16_t ∗values)
- MODBUS_EXPORT StatusCode cCpoWriteSingleCoil (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, bool value)
- MODBUS_EXPORT StatusCode cCpoWriteSingleRegister (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t value)
- MODBUS_EXPORT StatusCode cCpoReadExceptionStatus (cModbusClientPort clientPort, uint8_t unit, uint8_t ∗value)
- MODBUS_EXPORT StatusCode cCpoWriteMultipleCoils (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, const void ∗values)
- MODBUS_EXPORT StatusCode cCpoWriteMultipleRegisters (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, const uint16_t ∗values)
- MODBUS_EXPORT StatusCode cCpoReadCoilsAsBoolArray (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, bool ∗values)
- MODBUS_EXPORT StatusCode cCpoReadDiscreteInputsAsBoolArray (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, bool ∗values)

- MODBUS_EXPORT StatusCode cCpoWriteMultipleCoilsAsBoolArray (cModbusClientPort clientPort, uint8_t unit, uint16_t offset, uint16_t count, const bool *values)
- MODBUS_EXPORT StatusCode cCpoGetLastStatus (cModbusClientPort clientPort)
- MODBUS_EXPORT StatusCode cCpoGetLastErrorStatus (cModbusClientPort clientPort)
- MODBUS_EXPORT const Char * cCpoGetLastErrorText (cModbusClientPort clientPort)
- MODBUS_EXPORT void cCpoConnectOpened (cModbusClientPort clientPort, pfSlotOpened funcPtr)
- MODBUS_EXPORT void cCpoConnectClosed (cModbusClientPort clientPort, pfSlotClosed funcPtr)
- MODBUS_EXPORT void cCpoConnectTx (cModbusClientPort clientPort, pfSlotTx funcPtr)
- MODBUS_EXPORT void cCpoConnectRx (cModbusClientPort clientPort, pfSlotRx funcPtr)
- MODBUS_EXPORT void cCpoConnectError (cModbusClientPort clientPort, pfSlotError funcPtr)
- MODBUS_EXPORT void cCpoDisconnectFunc (cModbusClientPort clientPort, void *funcPtr)
- MODBUS_EXPORT cModbusClient cCliCreate (uint8_t unit, ProtocolType type, const void *settings, bool blocking)
- MODBUS_EXPORT cModbusClient cCliCreateForClientPort (uint8_t unit, cModbusClientPort clientPort)
- MODBUS_EXPORT void cCliDelete (cModbusClient client)
- MODBUS_EXPORT const Char * cCliGetObjectName (cModbusClient client)
- MODBUS_EXPORT void cCliSetObjectName (cModbusClient client, const Char *name)
- MODBUS_EXPORT ProtocolType cCliGetType (cModbusClient client)
- MODBUS_EXPORT uint8_t cCliGetUnit (cModbusClient client)
- MODBUS_EXPORT void cCliSetUnit (cModbusClient client, uint8_t unit)
- MODBUS_EXPORT bool cCliIsOpen (cModbusClient client)
- MODBUS_EXPORT cModbusClientPort cCliGetPort (cModbusClient client)
- MODBUS_EXPORT StatusCode cReadCoils (cModbusClient client, uint16_t offset, uint16_t count, void *values)
- MODBUS_EXPORT StatusCode cReadDiscreteInputs (cModbusClient client, uint16_t offset, uint16_t count, void *values)
- MODBUS_EXPORT StatusCode cReadHoldingRegisters (cModbusClient client, uint16_t offset, uint16_t count, uint16_t *values)
- MODBUS_EXPORT StatusCode cReadInputRegisters (cModbusClient client, uint16_t offset, uint16_t count, uint16_t *values)
- MODBUS_EXPORT StatusCode cWriteSingleCoil (cModbusClient client, uint16_t offset, bool value)
- MODBUS_EXPORT StatusCode cWriteSingleRegister (cModbusClient client, uint16_t offset, uint16_t value)
- MODBUS_EXPORT StatusCode cReadExceptionStatus (cModbusClient client, uint8_t *value)
- MODBUS_EXPORT StatusCode cWriteMultipleCoils (cModbusClient client, uint16_t offset, uint16_t count, const void *values)
- MODBUS_EXPORT StatusCode cWriteMultipleRegisters (cModbusClient client, uint16_t offset, uint16_t count, const uint16_t *values)
- MODBUS_EXPORT StatusCode cReadCoilsAsBoolArray (cModbusClient client, uint16_t offset, uint16_t count, bool *values)
- MODBUS_EXPORT StatusCode cReadDiscreteInputsAsBoolArray (cModbusClient client, uint16_t offset, uint16_t count, bool *values)
- MODBUS_EXPORT StatusCode cWriteMultipleCoilsAsBoolArray (cModbusClient client, uint16_t offset, uint16_t count, const bool *values)
- MODBUS_EXPORT StatusCode cCliGetLastPortStatus (cModbusClient client)
- MODBUS_EXPORT StatusCode cCliGetLastPortErrorStatus (cModbusClient client)
- MODBUS_EXPORT const Char * cCliGetLastPortErrorText (cModbusClient client)
- MODBUS_EXPORT cModbusServerPort cSpoCreate (cModbusInterface device, ProtocolType type, const void *settings, bool blocking)
- MODBUS_EXPORT void cSpoDelete (cModbusServerPort serverPort)
- MODBUS_EXPORT const Char * cSpoGetObjectName (cModbusServerPort serverPort)
- MODBUS_EXPORT void cSpoSetObjectName (cModbusServerPort serverPort, const Char *name)
- MODBUS_EXPORT ProtocolType cSpoGetType (cModbusServerPort serverPort)
- MODBUS_EXPORT bool cSpoIsTcpServer (cModbusServerPort serverPort)
- MODBUS_EXPORT cModbusInterface cSpoGetDevice (cModbusServerPort serverPort)
- MODBUS_EXPORT bool cSpoIsOpen (cModbusServerPort serverPort)

- MODBUS_EXPORT StatusCode cSpoOpen (cModbusServerPort serverPort)
- MODBUS_EXPORT StatusCode cSpoClose (cModbusServerPort serverPort)
- MODBUS_EXPORT StatusCode cSpoProcess (cModbusServerPort serverPort)
- MODBUS_EXPORT void cSpoConnectOpened (cModbusServerPort serverPort, pfSlotOpened funcPtr)
- MODBUS_EXPORT void cSpoConnectClosed (cModbusServerPort serverPort, pfSlotClosed funcPtr)
- MODBUS_EXPORT void cSpoConnectTx (cModbusServerPort serverPort, pfSlotTx funcPtr)
- MODBUS_EXPORT void cSpoConnectRx (cModbusServerPort serverPort, pfSlotRx funcPtr)
- MODBUS_EXPORT void cSpoConnectError (cModbusServerPort serverPort, pfSlotError funcPtr)
- MODBUS_EXPORT void cSpoConnectNewConnection (cModbusServerPort serverPort, pfSlotNewConnection funcPtr)
- MODBUS_EXPORT void cSpoConnectCloseConnection (cModbusServerPort serverPort, pfSlotCloseConnection funcPtr)
- MODBUS_EXPORT void cSpoDisconnectFunc (cModbusServerPort serverPort, void *funcPtr)

8.1.1 Detailed Description

Contains library interface for C language.

Author

serhmarch

Date

May 2024

8.1.2 Typedef Documentation

8.1.2.1 pfReadCoils

```
typedef StatusCode(* pfReadCoils) (cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t
count, void *values)
```

Pointer to C function for read coils (0x). `dev` - pointer to any struct that can hold memory data.

See also

`ModbusInterface::readCoils`

8.1.2.2 pfReadDiscreteInputs

```
typedef StatusCode(* pfReadDiscreteInputs) (cModbusDevice dev, uint8_t unit, uint16_t offset,
uint16_t count, void *values)
```

Pointer to C function for read discrete inputs (1x). `dev` - pointer to any struct that can hold memory data.

See also

`ModbusInterface::readDiscreteInputs`

8.1.2.3 pfReadExceptionStatus

```
typedef StatusCode(* pfReadExceptionStatus) (cModbusDevice dev, uint8_t unit, uint8_t *status)
```

Pointer to C function for read exception status bits. `dev` - pointer to any struct that can hold memory data.

See also

ModbusInterface::readExceptionStatus

8.1.2.4 pfReadHoldingRegisters

```
typedef StatusCode(* pfReadHoldingRegisters) (cModbusDevice dev, uint8_t unit, uint16_t offset,
uint16_t count, uint16_t *values)
```

Pointer to C function for read holding registers (4x). `dev` - pointer to any struct that can hold memory data.

See also

ModbusInterface::readHoldingRegisters

8.1.2.5 pfReadInputRegisters

```
typedef StatusCode(* pfReadInputRegisters) (cModbusDevice dev, uint8_t unit, uint16_t offset,
uint16_t count, uint16_t *values)
```

Pointer to C function for read input registers (3x). `dev` - pointer to any struct that can hold memory data.

See also

ModbusInterface::readInputRegisters

8.1.2.6 pfSlotCloseConnection

```
typedef void(* pfSlotCloseConnection) (const Char *source)
```

Pointer to C callback function. `dev` - pointer to any struct that can hold memory data.

See also

ModbusTcpServer::signalCloseConnection

8.1.2.7 pfSlotClosed

```
typedef void(* pfSlotClosed) (const Char *source)
```

Pointer to C callback function. `dev` - pointer to any struct that can hold memory data.

See also

ModbusClientPort::signalClosed and ModbusServerPort::signalClosed

8.1.2.8 pfSlotError

```
typedef void(* pfSlotError) (const Char *source, StatusCode status, const Char *text)
```

Pointer to C callback function. dev - pointer to any struct that can hold memory data.

See also

ModbusClientPort::signalError and ModbusServerPort::signalError

8.1.2.9 pfSlotNewConnection

```
typedef void(* pfSlotNewConnection) (const Char *source)
```

Pointer to C callback function. dev - pointer to any struct that can hold memory data.

See also

ModbusTcpServer::signalNewConnection

8.1.2.10 pfSlotOpened

```
typedef void(* pfSlotOpened) (const Char *source)
```

Pointer to C callback function. dev - pointer to any struct that can hold memory data.

See also

ModbusClientPort::signalOpened and ModbusServerPort::signalOpened

8.1.2.11 pfSlotRx

```
typedef void(* pfSlotRx) (const Char *source, const uint8_t *buff, uint16_t size)
```

Pointer to C callback function. dev - pointer to any struct that can hold memory data.

See also

ModbusClientPort::signalRx and ModbusServerPort::signalRx

8.1.2.12 pfSlotTx

```
typedef void(* pfSlotTx) (const Char *source, const uint8_t *buff, uint16_t size)
```

Pointer to C callback function. dev - pointer to any struct that can hold memory data.

See also

ModbusClientPort::signalTx and ModbusServerPort::signalTx

8.1.2.13 pfWriteMultipleCoils

```
typedef StatusCode(* pfWriteMultipleCoils) (cModbusDevice dev, uint8_t unit, uint16_t offset,
uint16_t count, const void *values)
```

Pointer to C function for write coils (0x). `dev` - pointer to any struct that can hold memory data.

See also

ModbusInterface::writeMultipleCoils

8.1.2.14 pfWriteMultipleRegisters

```
typedef StatusCode(* pfWriteMultipleRegisters) (cModbusDevice dev, uint8_t unit, uint16_↩
t offset, uint16_t count, const uint16_t *values)
```

Pointer to C function for write registers (4x). `dev` - pointer to any struct that can hold memory data.

See also

ModbusInterface::writeMultipleRegisters

8.1.2.15 pfWriteSingleCoil

```
typedef StatusCode(* pfWriteSingleCoil) (cModbusDevice dev, uint8_t unit, uint16_t offset,
bool value)
```

Pointer to C function for write single coil (0x). `dev` - pointer to any struct that can hold memory data.

See also

ModbusInterface::writeSingleCoil

8.1.2.16 pfWriteSingleRegister

```
typedef StatusCode(* pfWriteSingleRegister) (cModbusDevice dev, uint8_t unit, uint16_t offset,
uint16_t value)
```

Pointer to C function for write single register (4x). `dev` - pointer to any struct that can hold memory data.

See also

ModbusInterface::writeSingleRegister

8.1.3 Function Documentation

8.1.3.1 cCliCreate()

```
MODBUS_EXPORT cModbusClient cCliCreate (
            uint8_t unit,
            ProtocolType type,
            const void * settings,
            bool blocking )
```

Creates ModbusClient object and returns handle to it.

See also

Modbus::createClient

8.1.3.2 cCliCreateForClientPort()

```
MODBUS_EXPORT cModbusClient cCliCreateForClientPort (
            uint8_t unit,
            cModbusClientPort clientPort )
```

Creates ModbusClient object with unit for port clientPort and returns handle to it.

8.1.3.3 cCliDelete()

```
MODBUS_EXPORT void cCliDelete (
            cModbusClient client )
```

Deletes previously created ModbusClient object represented by client handle

8.1.3.4 cCliGetLastPortErrorStatus()

```
MODBUS_EXPORT StatusCode cCliGetLastPortErrorStatus (
            cModbusClient client )
```

Wrapper for ModbusClient::lastPortErrorStatus

8.1.3.5 cCliGetLastPortErrorText()

```
MODBUS_EXPORT const Char * cCliGetLastPortErrorText (
            cModbusClient client )
```

Wrapper for ModbusClient::lastPortErrorText

8.1.3.6 cCliGetLastPortStatus()

```
MODBUS_EXPORT StatusCode cCliGetLastPortStatus (
            cModbusClient client )
```

Wrapper for ModbusClient::lastPortStatus

8.1.3.7 cCliGetObjectName()

```
MODBUS_EXPORT const Char * cCliGetObjectName (
            cModbusClient client )
```

Wrapper for ModbusClient::objectName

8.1.3.8 cCliGetPort()

```
MODBUS_EXPORT cModbusClientPort cCliGetPort (
            cModbusClient client )
```

Wrapper for ModbusClient::port

8.1.3.9 cCliGetType()

```
MODBUS_EXPORT ProtocolType cCliGetType (
            cModbusClient client )
```

Wrapper for ModbusClient::type

8.1.3.10 cCliGetUnit()

```
MODBUS_EXPORT uint8_t cCliGetUnit (
            cModbusClient client )
```

Wrapper for ModbusClient::unit

8.1.3.11 cCliIsOpen()

```
MODBUS_EXPORT bool cCliIsOpen (
            cModbusClient client )
```

Wrapper for ModbusClient::isOpen

8.1.3.12 cCliSetObjectName()

```
MODBUS_EXPORT void cCliSetObjectName (
            cModbusClient client,
            const Char * name )
```

Wrapper for ModbusClient::setObjectName

8.1.3.13 cCliSetUnit()

```
MODBUS_EXPORT void cCliSetUnit (
            cModbusClient client,
            uint8_t unit )
```

Wrapper for ModbusClient::setUnit

8.1.3.14 cCpoClose()

```
MODBUS_EXPORT bool cCpoClose (
            cModbusClientPort clientPort )
```

Wrapper for ModbusClientPort::close

8.1.3.15 cCpoConnectClosed()

```
MODBUS_EXPORT void cCpoConnectClosed (
            cModbusClientPort clientPort,
            pfSlotClosed funcPtr )
```

Connects funcPtr-function to ModbusClientPort::signalClosed signal

8.1.3.16 cCpoConnectError()

```
MODBUS_EXPORT void cCpoConnectError (
            cModbusClientPort clientPort,
            pfSlotError funcPtr )
```

Connects funcPtr-function to ModbusClientPort::signalError signal

8.1.3.17 cCpoConnectOpened()

```
MODBUS_EXPORT void cCpoConnectOpened (
            cModbusClientPort clientPort,
            pfSlotOpened funcPtr )
```

Connects funcPtr-function to ModbusClientPort::signalOpened signal

8.1.3.18 cCpoConnectRx()

```
MODBUS_EXPORT void cCpoConnectRx (
            cModbusClientPort clientPort,
            pfSlotRx funcPtr )
```

Connects funcPtr-function to ModbusClientPort::signalRx signal

8.1.3.19 cCpoConnectTx()

```
MODBUS_EXPORT void cCpoConnectTx (
            cModbusClientPort clientPort,
            pfSlotTx funcPtr )
```

Connects `funcPtr`-function to `ModbusClientPort::signalTx` signal

8.1.3.20 cCpoCreate()

```
MODBUS_EXPORT cModbusClientPort cCpoCreate (
            ProtocolType type,
            const void * settings,
            bool blocking )
```

Creates `ModbusClientPort` object and returns handle to it.

See also

`Modbus::createClientPort`

8.1.3.21 cCpoCreateForPort()

```
MODBUS_EXPORT cModbusClientPort cCpoCreateForPort (
            cModbusPort port )
```

Creates `ModbusClientPort` object and returns handle to it.

8.1.3.22 cCpoDelete()

```
MODBUS_EXPORT void cCpoDelete (
            cModbusClientPort clientPort )
```

Deletes previously created `ModbusClientPort` object represented by `port` handle

8.1.3.23 cCpoDisconnectFunc()

```
MODBUS_EXPORT void cCpoDisconnectFunc (
            cModbusClientPort clientPort,
            void * funcPtr )
```

Disconnects `funcPtr`-function from `ModbusClientPort`

8.1.3.24 cCpoGetLastErrorStatus()

```
MODBUS_EXPORT StatusCode cCpoGetLastErrorStatus (
            cModbusClientPort clientPort )
```

Wrapper for `ModbusClientPort::getLastErrorStatus`

8.1.3.25 cCpoGetLastErrorText()

```
MODBUS_EXPORT const Char * cCpoGetLastErrorText (
            cModbusClientPort clientPort )
```

Wrapper for `ModbusClientPort::getLastErrorText`

8.1.3.26 cCpoGetLastStatus()

```
MODBUS_EXPORT StatusCode cCpoGetLastStatus (
            cModbusClientPort clientPort )
```

Wrapper for `ModbusClientPort::getLastStatus`

8.1.3.27 cCpoGetObjectName()

```
MODBUS_EXPORT const Char * cCpoGetObjectName (
            cModbusClientPort clientPort )
```

Wrapper for `ModbusClientPort::objectName`

8.1.3.28 cCpoGetRepeatCount()

```
MODBUS_EXPORT uint32_t cCpoGetRepeatCount (
            cModbusClientPort clientPort )
```

Wrapper for `ModbusClientPort::repeatCount`

8.1.3.29 cCpoGetType()

```
MODBUS_EXPORT ProtocolType cCpoGetType (
            cModbusClientPort clientPort )
```

Wrapper for `ModbusClientPort::type`

8.1.3.30 cCpoIsOpen()

```
MODBUS_EXPORT bool cCpoIsOpen (
            cModbusClientPort clientPort )
```

Wrapper for `ModbusClientPort::isOpen`

8.1.3.31 cCpoReadCoils()

```
MODBUS_EXPORT StatusCode cCpoReadCoils (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            void * values )
```

Wrapper for `ModbusClientPort::readCoils`

8.1.3.32 cCpoReadCoilsAsBoolArray()

```
MODBUS_EXPORT StatusCode cCpoReadCoilsAsBoolArray (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            bool * values )
```

Wrapper for ModbusClientPort::readCoilsAsBoolArray

8.1.3.33 cCpoReadDiscreteInputs()

```
MODBUS_EXPORT StatusCode cCpoReadDiscreteInputs (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            void * values )
```

Wrapper for ModbusClientPort::readDiscreteInputs

8.1.3.34 cCpoReadDiscreteInputsAsBoolArray()

```
MODBUS_EXPORT StatusCode cCpoReadDiscreteInputsAsBoolArray (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            bool * values )
```

Wrapper for ModbusClientPort::readDiscreteInputsAsBoolArray

8.1.3.35 cCpoReadExceptionStatus()

```
MODBUS_EXPORT StatusCode cCpoReadExceptionStatus (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint8_t * value )
```

Wrapper for ModbusClientPort::readExceptionStatus

8.1.3.36 cCpoReadHoldingRegisters()

```
MODBUS_EXPORT StatusCode cCpoReadHoldingRegisters (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )
```

Wrapper for ModbusClientPort::readHoldingRegisters

8.1.3.37 cCpoReadInputRegisters()

```
MODBUS_EXPORT StatusCode cCpoReadInputRegisters (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )
```

Wrapper for ModbusClientPort::readInputRegisters

8.1.3.38 cCpoSetObjectName()

```
MODBUS_EXPORT void cCpoSetObjectName (
            cModbusClientPort clientPort,
            const Char * name )
```

Wrapper for ModbusClientPort::setObjectName

8.1.3.39 cCpoSetRepeatCount()

```
MODBUS_EXPORT void cCpoSetRepeatCount (
            cModbusClientPort clientPort,
            uint32_t count )
```

Wrapper for ModbusClientPort::repeatCount

8.1.3.40 cCpoWriteMultipleCoils()

```
MODBUS_EXPORT StatusCode cCpoWriteMultipleCoils (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const void * values )
```

Wrapper for ModbusClientPort::writeMultipleCoils

8.1.3.41 cCpoWriteMultipleCoilsAsBoolArray()

```
MODBUS_EXPORT StatusCode cCpoWriteMultipleCoilsAsBoolArray (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const bool * values )
```

Wrapper for ModbusClientPort::writeMultipleCoilsAsBoolArray

8.1.3.42 cCpoWriteMultipleRegisters()

```
MODBUS_EXPORT StatusCode cCpoWriteMultipleRegisters (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t count,
            const uint16_t * values )
```

Wrapper for ModbusClientPort::writeMultipleRegisters

8.1.3.43 cCpoWriteSingleCoil()

```
MODBUS_EXPORT StatusCode cCpoWriteSingleCoil (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            bool value )
```

Wrapper for ModbusClientPort::writeSingleCoil

8.1.3.44 cCpoWriteSingleRegister()

```
MODBUS_EXPORT StatusCode cCpoWriteSingleRegister (
            cModbusClientPort clientPort,
            uint8_t unit,
            uint16_t offset,
            uint16_t value )
```

Wrapper for ModbusClientPort::writeSingleRegister

8.1.3.45 cCreateModbusDevice()

```
MODBUS_EXPORT cModbusInterface cCreateModbusDevice (
            cModbusDevice device,
            pfReadCoils readCoils,
            pfReadDiscreteInputs readDiscreteInputs,
            pfReadHoldingRegisters readHoldingRegisters,
            pfReadInputRegisters readInputRegisters,
            pfWriteSingleCoil writeSingleCoil,
            pfWriteSingleRegister writeSingleRegister,
            pfReadExceptionStatus readExceptionStatus,
            pfWriteMultipleCoils writeMultipleCoils,
            pfWriteMultipleRegisters writeMultipleRegisters )
```

Function create ModbusInterface object and returns pointer to it for server. dev - pointer to any struct that can hold memory data. readCoils, readDiscreteInputs, readHoldingRegisters, readInputRegisters, writeSingle↩ Coil, writeSingleRegister, readExceptionStatus, writeMultipleCoils - pointers to corresponding Modbus functions to process data. Any pointer can have NULL value. In this case server will return Status_BadIllegal↩ Function.

8.1.3.46 cDeleteModbusDevice()

```
MODBUS_EXPORT void cDeleteModbusDevice (
            cModbusInterface dev )
```

Deletes previously created ModbusInterface object represented by dev handle

8.1.3.47 cPortCreate()

```
MODBUS_EXPORT cModbusPort cPortCreate (
            ProtocolType type,
            const void * settings,
            bool blocking )
```

Creates ModbusPort object and returns handle to it.

See also

Modbus::createPort

8.1.3.48 cPortDelete()

```
MODBUS_EXPORT void cPortDelete (
            cModbusPort port )
```

Deletes previously created ModbusPort object represented by port handle

8.1.3.49 cReadCoils()

```
MODBUS_EXPORT StatusCode cReadCoils (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            void * values )
```

Wrapper for ModbusClient::readCoils

8.1.3.50 cReadCoilsAsBoolArray()

```
MODBUS_EXPORT StatusCode cReadCoilsAsBoolArray (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            bool * values )
```

Wrapper for ModbusClient::readCoilsAsBoolArray

8.1.3.51 cReadDiscreteInputs()

```
MODBUS_EXPORT StatusCode cReadDiscreteInputs (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            void * values )
```

Wrapper for ModbusClient::readDiscreteInputs

8.1.3.52 cReadDiscreteInputsAsBoolArray()

```
MODBUS_EXPORT StatusCode cReadDiscreteInputsAsBoolArray (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            bool * values )
```

Wrapper for ModbusClient::readDiscreteInputsAsBoolArray

8.1.3.53 cReadExceptionStatus()

```
MODBUS_EXPORT StatusCode cReadExceptionStatus (
            cModbusClient client,
            uint8_t * value )
```

Wrapper for ModbusClient::readExceptionStatus

8.1.3.54 cReadHoldingRegisters()

```
MODBUS_EXPORT StatusCode cReadHoldingRegisters (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )
```

Wrapper for ModbusClient::readHoldingRegisters

8.1.3.55 cReadInputRegisters()

```
MODBUS_EXPORT StatusCode cReadInputRegisters (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            uint16_t * values )
```

Wrapper for ModbusClient::readInputRegisters

8.1.3.56 cSpoClose()

```
MODBUS_EXPORT StatusCode cSpoClose (
            cModbusServerPort serverPort )
```

Wrapper for ModbusServerPort::close

8.1.3.57 cSpoConnectCloseConnection()

```
MODBUS_EXPORT void cSpoConnectCloseConnection (
            cModbusServerPort serverPort,
            pfSlotCloseConnection funcPtr )
```

Connects funcPtr-function to ModbusServerPort::signalCloseConnection signal

8.1.3.58 cSpoConnectClosed()

```
MODBUS_EXPORT void cSpoConnectClosed (
            cModbusServerPort serverPort,
            pfSlotClosed funcPtr )
```

Connects funcPtr-function to ModbusServerPort::signalClosed signal

8.1.3.59 cSpoConnectError()

```
MODBUS_EXPORT void cSpoConnectError (
            cModbusServerPort serverPort,
            pfSlotError funcPtr )
```

Connects funcPtr-function to ModbusServerPort::signalError signal

8.1.3.60 cSpoConnectNewConnection()

```
MODBUS_EXPORT void cSpoConnectNewConnection (
            cModbusServerPort serverPort,
            pfSlotNewConnection funcPtr )
```

Connects funcPtr-function to ModbusServerPort::signalNewConnection signal

8.1.3.61 cSpoConnectOpened()

```
MODBUS_EXPORT void cSpoConnectOpened (
            cModbusServerPort serverPort,
            pfSlotOpened funcPtr )
```

Connects funcPtr-function to ModbusServerPort::signalOpened signal

8.1.3.62 cSpoConnectRx()

```
MODBUS_EXPORT void cSpoConnectRx (
            cModbusServerPort serverPort,
            pfSlotRx funcPtr )
```

Connects `funcPtr`-function to `ModbusServerPort::signalRx` signal

8.1.3.63 cSpoConnectTx()

```
MODBUS_EXPORT void cSpoConnectTx (
            cModbusServerPort serverPort,
            pfSlotTx funcPtr )
```

Connects `funcPtr`-function to `ModbusServerPort::signalTx` signal

8.1.3.64 cSpoCreate()

```
MODBUS_EXPORT cModbusServerPort cSpoCreate (
            cModbusInterface device,
            ProtocolType type,
            const void * settings,
            bool blocking )
```

Creates `ModbusServerPort` object and returns handle to it.

See also

`Modbus::createServerPort`

8.1.3.65 cSpoDelete()

```
MODBUS_EXPORT void cSpoDelete (
            cModbusServerPort serverPort )
```

Deletes previously created `ModbusServerPort` object represented by `serverPort` handle

8.1.3.66 cSpoDisconnectFunc()

```
MODBUS_EXPORT void cSpoDisconnectFunc (
            cModbusServerPort serverPort,
            void * funcPtr )
```

Disconnects `funcPtr`-function from `ModbusServerPort`

8.1.3.67 cSpoGetDevice()

```
MODBUS_EXPORT cModbusInterface cSpoGetDevice (
            cModbusServerPort serverPort )
```

Wrapper for `ModbusServerPort::device`

8.1.3.68 cSpoGetObjectName()

```
MODBUS_EXPORT const Char * cSpoGetObjectName (
            cModbusServerPort serverPort )
```

Wrapper for ModbusServerPort::objectName

8.1.3.69 cSpoGetType()

```
MODBUS_EXPORT ProtocolType cSpoGetType (
            cModbusServerPort serverPort )
```

Wrapper for ModbusServerPort::type

8.1.3.70 cSpoIsOpen()

```
MODBUS_EXPORT bool cSpoIsOpen (
            cModbusServerPort serverPort )
```

Wrapper for ModbusServerPort::isOpen

8.1.3.71 cSpoIsTcpServer()

```
MODBUS_EXPORT bool cSpoIsTcpServer (
            cModbusServerPort serverPort )
```

Wrapper for ModbusServerPort::isTcpServer

8.1.3.72 cSpoOpen()

```
MODBUS_EXPORT StatusCode cSpoOpen (
            cModbusServerPort serverPort )
```

Wrapper for ModbusServerPort::open

8.1.3.73 cSpoProcess()

```
MODBUS_EXPORT StatusCode cSpoProcess (
            cModbusServerPort serverPort )
```

Wrapper for ModbusServerPort::process

8.1.3.74 cSpoSetObjectName()

```
MODBUS_EXPORT void cSpoSetObjectName (
            cModbusServerPort serverPort,
            const Char * name )
```

Wrapper for ModbusServerPort::setObjectName

8.1.3.75 cWriteMultipleCoils()

```
MODBUS_EXPORT StatusCode cWriteMultipleCoils (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            const void * values )
```

Wrapper for ModbusClient::writeMultipleCoils

8.1.3.76 cWriteMultipleCoilsAsBoolArray()

```
MODBUS_EXPORT StatusCode cWriteMultipleCoilsAsBoolArray (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            const bool * values )
```

Wrapper for ModbusClient::lastPortStatus

8.1.3.77 cWriteMultipleRegisters()

```
MODBUS_EXPORT StatusCode cWriteMultipleRegisters (
            cModbusClient client,
            uint16_t offset,
            uint16_t count,
            const uint16_t * values )
```

Wrapper for ModbusClient::writeMultipleRegisters

8.1.3.78 cWriteSingleCoil()

```
MODBUS_EXPORT StatusCode cWriteSingleCoil (
            cModbusClient client,
            uint16_t offset,
            bool value )
```

Wrapper for ModbusClient::writeSingleCoil

8.1.3.79 cWriteSingleRegister()

```
MODBUS_EXPORT StatusCode cWriteSingleRegister (
            cModbusClient client,
            uint16_t offset,
            uint16_t value )
```

Wrapper for ModbusClient::writeSingleRegister

8.2 cModbus.h

Go to the documentation of this file.

```
00001
00008 #ifndef CMODBUS_H
00009 #define CMODBUS_H
00010
00011 #include <stdbool.h>
00012 #include "ModbusGlobal.h"
00013
00014 #ifdef __cplusplus
00015 using namespace Modbus;
00016 extern "C" {
00017 #endif
00018
00019 #ifdef __cplusplus
00020 class ModbusPort      ;
00021 class ModbusClientPort;
00022 class ModbusClient    ;
00023 class ModbusServerPort;
00024 class ModbusInterface ;
00025
00026 #else
00027 typedef struct ModbusPort       ModbusPort      ;
00028 typedef struct ModbusClientPort ModbusClientPort;
00029 typedef struct ModbusClient     ModbusClient    ;
00030 typedef struct ModbusServerPort ModbusServerPort;
00031 typedef struct ModbusInterface  ModbusInterface ;
00032 #endif
00033
00034
00036 typedef ModbusPort* cModbusPort;
00037
00039 typedef ModbusClientPort* cModbusClientPort;
00040
00042 typedef ModbusClient* cModbusClient;
00043
00045 typedef ModbusServerPort* cModbusServerPort;
00046
00048 typedef ModbusInterface* cModbusInterface;
00049
00051 typedef void* cModbusDevice;
00052
00054 typedef StatusCode (*pfReadCoils)(cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t count,
      void *values);
00055
00057 typedef StatusCode (*pfReadDiscreteInputs)(cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t
      count, void *values);
00058
00060 typedef StatusCode (*pfReadHoldingRegisters)(cModbusDevice dev, uint8_t unit, uint16_t offset,
      uint16_t count, uint16_t *values);
00061
00063 typedef StatusCode (*pfReadInputRegisters)(cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t
      count, uint16_t *values);
00064
00066 typedef StatusCode (*pfWriteSingleCoil)(cModbusDevice dev, uint8_t unit, uint16_t offset, bool value);
00067
00069 typedef StatusCode (*pfWriteSingleRegister)(cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t
      value);
00070
00072 typedef StatusCode (*pfReadExceptionStatus)(cModbusDevice dev, uint8_t unit, uint8_t *status);
00073
00075 typedef StatusCode (*pfWriteMultipleCoils)(cModbusDevice dev, uint8_t unit, uint16_t offset, uint16_t
      count, const void *values);
00076
00078 typedef StatusCode (*pfWriteMultipleRegisters)(cModbusDevice dev, uint8_t unit, uint16_t offset,
      uint16_t count, const uint16_t *values);
00079
00081 typedef void (*pfSlotOpened)(const Char *source);
00082
00084 typedef void (*pfSlotClosed)(const Char *source);
00085
00087 typedef void (*pfSlotTx)(const Char *source, const uint8_t* buff, uint16_t size);
00088
00090 typedef void (*pfSlotRx)(const Char *source, const uint8_t* buff, uint16_t size);
00091
00093 typedef void (*pfSlotError)(const Char *source, StatusCode status, const Char *text);
00094
00096 typedef void (*pfSlotNewConnection)(const Char *source);
00097
00099 typedef void (*pfSlotCloseConnection)(const Char *source);
00100
00112 MODBUS_EXPORT cModbusInterface cCreateModbusDevice(cModbusDevice           device               ,
00113                                                    pfReadCoils             readCoils            ,
00114                                                    pfReadDiscreteInputs    readDiscreteInputs   ,
```

```
00115                                                 pfReadHoldingRegisters   readHoldingRegisters  ,
00116                                                 pfReadInputRegisters     readInputRegisters    ,
00117                                                 pfWriteSingleCoil        writeSingleCoil       ,
00118                                                 pfWriteSingleRegister    writeSingleRegister   ,
00119                                                 pfReadExceptionStatus    readExceptionStatus   ,
00120                                                 pfWriteMultipleCoils     writeMultipleCoils    ,
00121                                                 pfWriteMultipleRegisters writeMultipleRegisters);
00122
00123
00125 MODBUS_EXPORT void cDeleteModbusDevice(cModbusInterface dev);
00126
00127 //
      ------------------------------------------------------------------------------------------------------------
00128 // ---------------------------------------------- ModbusPort
      ----------------------------------------------
00129 //
      ------------------------------------------------------------------------------------------------------------
00130
00132 MODBUS_EXPORT cModbusPort cPortCreate(ProtocolType type, const void *settings, bool blocking);
00133
00135 MODBUS_EXPORT void cPortDelete(cModbusPort port);
00136
00137
00138 //
      ------------------------------------------------------------------------------------------------------------
00139 // ------------------------------------------- ModbusClientPort
      -------------------------------------------
00140 //
      ------------------------------------------------------------------------------------------------------------
00141
00143 MODBUS_EXPORT cModbusClientPort cCpoCreate(ProtocolType type, const void *settings, bool blocking);
00144
00146 MODBUS_EXPORT cModbusClientPort cCpoCreateForPort(cModbusPort port);
00147
00149 MODBUS_EXPORT void cCpoDelete(cModbusClientPort clientPort);
00150
00152 MODBUS_EXPORT const Char *cCpoGetObjectName(cModbusClientPort clientPort);
00153
00155 MODBUS_EXPORT void cCpoSetObjectName(cModbusClientPort clientPort, const Char *name);
00156
00158 MODBUS_EXPORT ProtocolType cCpoGetType(cModbusClientPort clientPort);
00159
00161 MODBUS_EXPORT bool cCpoIsOpen(cModbusClientPort clientPort);
00162
00164 MODBUS_EXPORT bool cCpoClose(cModbusClientPort clientPort);
00165
00167 MODBUS_EXPORT uint32_t cCpoGetRepeatCount(cModbusClientPort clientPort);
00168
00170 MODBUS_EXPORT void cCpoSetRepeatCount(cModbusClientPort clientPort, uint32_t count);
00171
00173 MODBUS_EXPORT StatusCode cCpoReadCoils(cModbusClientPort clientPort, uint8_t unit, uint16_t offset,
      uint16_t count, void *values);
00174
00176 MODBUS_EXPORT StatusCode cCpoReadDiscreteInputs(cModbusClientPort clientPort, uint8_t unit, uint16_t
      offset, uint16_t count, void *values);
00177
00179 MODBUS_EXPORT StatusCode cCpoReadHoldingRegisters(cModbusClientPort clientPort, uint8_t unit, uint16_t
      offset, uint16_t count, uint16_t *values);
00180
00182 MODBUS_EXPORT StatusCode cCpoReadInputRegisters(cModbusClientPort clientPort, uint8_t unit, uint16_t
      offset, uint16_t count, uint16_t *values);
00183
00185 MODBUS_EXPORT StatusCode cCpoWriteSingleCoil(cModbusClientPort clientPort, uint8_t unit, uint16_t
      offset, bool value);
00186
00188 MODBUS_EXPORT StatusCode cCpoWriteSingleRegister(cModbusClientPort clientPort, uint8_t unit, uint16_t
      offset, uint16_t value);
00189
00191 MODBUS_EXPORT StatusCode cCpoReadExceptionStatus(cModbusClientPort clientPort, uint8_t unit, uint8_t
      *value);
00192
00194 MODBUS_EXPORT StatusCode cCpoWriteMultipleCoils(cModbusClientPort clientPort, uint8_t unit, uint16_t
      offset, uint16_t count, const void *values);
00195
00197 MODBUS_EXPORT StatusCode cCpoWriteMultipleRegisters(cModbusClientPort clientPort, uint8_t unit,
      uint16_t offset, uint16_t count, const uint16_t *values);
00198
00200 MODBUS_EXPORT StatusCode cCpoReadCoilsAsBoolArray(cModbusClientPort clientPort, uint8_t unit, uint16_t
      offset, uint16_t count, bool *values);
00201
00203 MODBUS_EXPORT StatusCode cCpoReadDiscreteInputsAsBoolArray(cModbusClientPort clientPort, uint8_t unit,
      uint16_t offset, uint16_t count, bool *values);
00204
00206 MODBUS_EXPORT StatusCode cCpoWriteMultipleCoilsAsBoolArray(cModbusClientPort clientPort, uint8_t unit,
      uint16_t offset, uint16_t count, const bool *values);
00207
00209 MODBUS_EXPORT StatusCode cCpoGetLastStatus(cModbusClientPort clientPort);
```

```
00210
00212 MODBUS_EXPORT StatusCode cCpoGetLastErrorStatus(cModbusClientPort clientPort);
00213
00215 MODBUS_EXPORT const Char *cCpoGetLastErrorText(cModbusClientPort clientPort);
00216
00218 MODBUS_EXPORT void cCpoConnectOpened(cModbusClientPort clientPort, pfSlotOpened funcPtr);
00219
00221 MODBUS_EXPORT void cCpoConnectClosed(cModbusClientPort clientPort, pfSlotClosed funcPtr);
00222
00224 MODBUS_EXPORT void cCpoConnectTx(cModbusClientPort clientPort, pfSlotTx funcPtr);
00225
00227 MODBUS_EXPORT void cCpoConnectRx(cModbusClientPort clientPort, pfSlotRx funcPtr);
00228
00230 MODBUS_EXPORT void cCpoConnectError(cModbusClientPort clientPort, pfSlotError funcPtr);
00231
00233 MODBUS_EXPORT void cCpoDisconnectFunc(cModbusClientPort clientPort, void *funcPtr);
00234
00235
00236 //
     ------------------------------------------------------------------------------------------------------------
00237 // ---------------------------------------------- ModbusClient
     ----------------------------------------------
00238 //
     ------------------------------------------------------------------------------------------------------------
00239
00241 MODBUS_EXPORT cModbusClient cCliCreate(uint8_t unit, ProtocolType type, const void *settings, bool
     blocking);
00242
00244 MODBUS_EXPORT cModbusClient cCliCreateForClientPort(uint8_t unit, cModbusClientPort clientPort);
00245
00247 MODBUS_EXPORT void cCliDelete(cModbusClient client);
00248
00250 MODBUS_EXPORT const Char *cCliGetObjectName(cModbusClient client);
00251
00253 MODBUS_EXPORT void cCliSetObjectName(cModbusClient client, const Char *name);
00254
00256 MODBUS_EXPORT ProtocolType cCliGetType(cModbusClient client);
00257
00259 MODBUS_EXPORT uint8_t cCliGetUnit(cModbusClient client);
00260
00262 MODBUS_EXPORT void cCliSetUnit(cModbusClient client, uint8_t unit);
00263
00265 MODBUS_EXPORT bool cCliIsOpen(cModbusClient client);
00266
00268 MODBUS_EXPORT cModbusClientPort cCliGetPort(cModbusClient client);
00269
00271 MODBUS_EXPORT StatusCode cReadCoils(cModbusClient client, uint16_t offset, uint16_t count, void
     *values);
00272
00274 MODBUS_EXPORT StatusCode cReadDiscreteInputs(cModbusClient client, uint16_t offset, uint16_t count,
     void *values);
00275
00277 MODBUS_EXPORT StatusCode cReadHoldingRegisters(cModbusClient client, uint16_t offset, uint16_t count,
     uint16_t *values);
00278
00280 MODBUS_EXPORT StatusCode cReadInputRegisters(cModbusClient client, uint16_t offset, uint16_t count,
     uint16_t *values);
00281
00283 MODBUS_EXPORT StatusCode cWriteSingleCoil(cModbusClient client, uint16_t offset, bool value);
00284
00286 MODBUS_EXPORT StatusCode cWriteSingleRegister(cModbusClient client, uint16_t offset, uint16_t value);
00287
00289 MODBUS_EXPORT StatusCode cReadExceptionStatus(cModbusClient client, uint8_t *value);
00290
00292 MODBUS_EXPORT StatusCode cWriteMultipleCoils(cModbusClient client, uint16_t offset, uint16_t count,
     const void *values);
00293
00295 MODBUS_EXPORT StatusCode cWriteMultipleRegisters(cModbusClient client, uint16_t offset, uint16_t
     count, const uint16_t *values);
00296
00298 MODBUS_EXPORT StatusCode cReadCoilsAsBoolArray(cModbusClient client, uint16_t offset, uint16_t count,
     bool *values);
00299
00301 MODBUS_EXPORT StatusCode cReadDiscreteInputsAsBoolArray(cModbusClient client, uint16_t offset,
     uint16_t count, bool *values);
00302
00304 MODBUS_EXPORT StatusCode cWriteMultipleCoilsAsBoolArray(cModbusClient client, uint16_t offset,
     uint16_t count, const bool *values);
00305
00307 MODBUS_EXPORT StatusCode cCliGetLastPortStatus(cModbusClient client);
00308
00310 MODBUS_EXPORT StatusCode cCliGetLastPortErrorStatus(cModbusClient client);
00311
00313 MODBUS_EXPORT const Char *cCliGetLastPortErrorText(cModbusClient client);
00314
00315
00316 //
```

```
00317 // ----------------------------------------- ModbusServerPort
      -----------------------------------------
00318 //
      ---------------------------------------------------------------------------------------------
00319
00321 MODBUS_EXPORT cModbusServerPort cSpoCreate(cModbusInterface device, ProtocolType type, const void
      *settings, bool blocking);
00322
00324 MODBUS_EXPORT void cSpoDelete(cModbusServerPort serverPort);
00325
00327 MODBUS_EXPORT const Char *cSpoGetObjectName(cModbusServerPort serverPort);
00328
00330 MODBUS_EXPORT void cSpoSetObjectName(cModbusServerPort serverPort, const Char *name);
00331
00333 MODBUS_EXPORT ProtocolType cSpoGetType(cModbusServerPort serverPort);
00334
00336 MODBUS_EXPORT bool cSpoIsTcpServer(cModbusServerPort serverPort);
00337
00339 MODBUS_EXPORT cModbusInterface cSpoGetDevice(cModbusServerPort serverPort);
00340
00342 MODBUS_EXPORT bool cSpoIsOpen(cModbusServerPort serverPort);
00343
00345 MODBUS_EXPORT StatusCode cSpoOpen(cModbusServerPort serverPort);
00346
00348 MODBUS_EXPORT StatusCode cSpoClose(cModbusServerPort serverPort);
00349
00351 MODBUS_EXPORT StatusCode cSpoProcess(cModbusServerPort serverPort);
00352
00354 MODBUS_EXPORT void cSpoConnectOpened(cModbusServerPort serverPort, pfSlotOpened funcPtr);
00355
00357 MODBUS_EXPORT void cSpoConnectClosed(cModbusServerPort serverPort, pfSlotClosed funcPtr);
00358
00360 MODBUS_EXPORT void cSpoConnectTx(cModbusServerPort serverPort, pfSlotTx funcPtr);
00361
00363 MODBUS_EXPORT void cSpoConnectRx(cModbusServerPort serverPort, pfSlotRx funcPtr);
00364
00366 MODBUS_EXPORT void cSpoConnectError(cModbusServerPort serverPort, pfSlotError funcPtr);
00367
00369 MODBUS_EXPORT void cSpoConnectNewConnection(cModbusServerPort serverPort, pfSlotNewConnection
      funcPtr);
00370
00372 MODBUS_EXPORT void cSpoConnectCloseConnection(cModbusServerPort serverPort, pfSlotCloseConnection
      funcPtr);
00373
00375 MODBUS_EXPORT void cSpoDisconnectFunc(cModbusServerPort serverPort, void *funcPtr);
00376
00377
00378 #ifdef __cplusplus
00379 } // extern "C"
00380 #endif
00381
00382 #endif // CMODBUS_H
```

8.3 c:/Users/march/Dropbox/PRJ/ModbusLib/src/Modbus.h File Reference

Contains general definitions of the Modbus protocol.

```
#include <string>
#include <list>
#include "ModbusGlobal.h"
```

Classes

- class ModbusInterface

  Main interface of Modbus communication protocol.

Namespaces

- namespace Modbus

  Main Modbus namespace. Contains classes, functions and constants to work with Modbus-protocol.

Typedefs

- typedef std::string **Modbus::String**

  Modbus::String class for strings.
- template<class T >
  using **Modbus::List** = std::list<T>

  Modbus::List template class.

Functions

- String Modbus::toModbusString (int val)
- MODBUS_EXPORT String Modbus::bytesToString (const uint8_t *buff, uint32_t count)
- MODBUS_EXPORT String Modbus::asciiToString (const uint8_t *buff, uint32_t count)
- MODBUS_EXPORT List< String > Modbus::availableSerialPorts ()
- MODBUS_EXPORT ModbusPort * Modbus::createPort (ProtocolType type, const void *settings, bool blocking)
- MODBUS_EXPORT ModbusClientPort * Modbus::createClientPort (ProtocolType type, const void *settings, bool blocking)
- MODBUS_EXPORT ModbusServerPort * Modbus::createServerPort (ModbusInterface *device, ProtocolType type, const void *settings, bool blocking)

8.3.1 Detailed Description

Contains general definitions of the Modbus protocol.

Author

serhmarch

Date

May 2024

8.4 Modbus.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUS_H
00009 #define MODBUS_H
00010
00011 #include <string>
00012 #include <list>
00013
00014 #include "ModbusGlobal.h"
00015
00016 class ModbusPort;
00017 class ModbusClientPort;
00018 class ModbusServerPort;
00019
00020 //
      ------------------------------------------------------------------------------------------------------------
00021 // ------------------------------------------ Modbus interface
      ------------------------------------------
00022 //
      ------------------------------------------------------------------------------------------------------------
00023
00040 class MODBUS_EXPORT ModbusInterface
00041 {
00042 public:
00049     virtual Modbus::StatusCode readCoils(uint8_t unit, uint16_t offset, uint16_t count, void *values);
00050
00057     virtual Modbus::StatusCode readDiscreteInputs(uint8_t unit, uint16_t offset, uint16_t count, void
      *values);
00058
00065     virtual Modbus::StatusCode readHoldingRegisters(uint8_t unit, uint16_t offset, uint16_t count,
      uint16_t *values);
00066
00073     virtual Modbus::StatusCode readInputRegisters(uint8_t unit, uint16_t offset, uint16_t count,
      uint16_t *values);
00074
00080     virtual Modbus::StatusCode writeSingleCoil(uint8_t unit, uint16_t offset, bool value);
00081
00087     virtual Modbus::StatusCode writeSingleRegister(uint8_t unit, uint16_t offset, uint16_t value);
00088
00093     virtual Modbus::StatusCode readExceptionStatus(uint8_t unit, uint8_t *status);
00094
00101     virtual Modbus::StatusCode writeMultipleCoils(uint8_t unit, uint16_t offset, uint16_t count, const
      void *values);
00102
00109     virtual Modbus::StatusCode writeMultipleRegisters(uint8_t unit, uint16_t offset, uint16_t count,
      const uint16_t *values);
00110 };
00111
00112 //
      ------------------------------------------------------------------------------------------------------------
00113 // ------------------------------------------ Modbus namespace
      ------------------------------------------
00114 //
      ------------------------------------------------------------------------------------------------------------


00115
00117 namespace Modbus {
00118
00120 typedef std::string String;
00121
00123 template <class T>
00124 using List = std::list<T>;
00125
00128 inline String toModbusString(int val) { return std::to_string(val); }
00129
00131 MODBUS_EXPORT String bytesToString(const uint8_t* buff, uint32_t count);
00132
00134 MODBUS_EXPORT String asciiToString(const uint8_t* buff, uint32_t count);
00135
00137 MODBUS_EXPORT List<String> availableSerialPorts();
00138
00143 MODBUS_EXPORT ModbusPort *createPort(ProtocolType type, const void *settings, bool blocking);
00144
00149 MODBUS_EXPORT ModbusClientPort *createClientPort(ProtocolType type, const void *settings, bool
      blocking);
00150
00156 MODBUS_EXPORT ModbusServerPort *createServerPort(ModbusInterface *device, ProtocolType type, const
      void *settings, bool blocking);
00157
00158 } //namespace Modbus
00159
00160 #endif // MODBUS_H
```

8.5 Modbus_config.h

```
00001 #ifndef MODBUS_CONFIG_H
00002 #define MODBUS_CONFIG_H
00003
00004 #define MODBUSLIB_VERSION_MAJOR 0
00005 #define MODBUSLIB_VERSION_MINOR 1
00006 #define MODBUSLIB_VERSION_PATCH 0
00007
00008 #endif // MODBUS_CONFIG_H
```

8.6 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusAscPort.h File Reference

Contains definition of ASCII serial port class.

`#include "ModbusSerialPort.h"`

Classes

- class ModbusAscPort

  Implements ASCII version of the Modbus communication protocol.

8.6.1 Detailed Description

Contains definition of ASCII serial port class.

Contains definition of base server side port class.

Author

serhmarch

Date

May 2024

8.7 ModbusAscPort.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSASCPORT_H
00009 #define MODBUSASCPORT_H
00010
00011 #include "ModbusSerialPort.h"
00012
00019 class MODBUS_EXPORT ModbusAscPort : public ModbusSerialPort
00020 {
00021 public:
00023     ModbusAscPort(bool blocking = false);
00024
00026     ~ModbusAscPort();
00027
00028 public:
00030     Modbus::ProtocolType type() const override { return Modbus::ASC; }
00031
00032 protected:
00033     Modbus::StatusCode writeBuffer(uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff)
      override;
00034     Modbus::StatusCode readBuffer(uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t maxSzBuff,
      uint16_t *szOutBuff) override;
00035
00036 protected:
00037     using ModbusSerialPort::ModbusSerialPort;
00038 };
00039
00040 #endif // MODBUSASCPORT_H
```

8.8 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusClient.h File Reference

Header file of Modbus client.

```
#include "ModbusObject.h"
```

Classes

- class ModbusClient

  The `ModbusClient` class implements the interface of the client part of the Modbus protocol.

8.8.1 Detailed Description

Header file of Modbus client.

Author

serhmarch

Date

May 2024

8.9 ModbusClient.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSCLIENT_H
00009 #define MODBUSCLIENT_H
00010
00011 #include "ModbusObject.h"
00012
00013 class ModbusClientPort;
00014
00024 class MODBUS_EXPORT ModbusClient : public ModbusObject
00025 {
00026 public:
00030     ModbusClient(uint8_t unit, ModbusClientPort *port);
00031
00032 public:
00034     Modbus::ProtocolType type() const;
00035
00037     uint8_t unit() const;
00038
00040     void setUnit(uint8_t unit);
00041
00043     bool isOpen() const;
00044
00046     ModbusClientPort *port() const;
00047
00048 public:
00050     Modbus::StatusCode readCoils(uint16_t offset, uint16_t count, void *values);
00051
00053     Modbus::StatusCode readDiscreteInputs(uint16_t offset, uint16_t count, void *values);
00054
00056     Modbus::StatusCode readHoldingRegisters(uint16_t offset, uint16_t count, uint16_t *values);
00057
00059     Modbus::StatusCode readInputRegisters(uint16_t offset, uint16_t count, uint16_t *values);
00060
00062     Modbus::StatusCode writeSingleCoil(uint16_t offset, bool value);
```

```
00063
00065     Modbus::StatusCode writeSingleRegister(uint16_t offset, uint16_t value);
00066
00068     Modbus::StatusCode readExceptionStatus(uint8_t *value);
00069
00071     Modbus::StatusCode writeMultipleCoils(uint16_t offset, uint16_t count, const void *values);
00072
00074     Modbus::StatusCode writeMultipleRegisters(uint16_t offset, uint16_t count, const uint16_t
      *values);
00075
00077     Modbus::StatusCode readCoilsAsBoolArray(uint16_t offset, uint16_t count, bool *values);
00078
00080     Modbus::StatusCode readDiscreteInputsAsBoolArray(uint16_t offset, uint16_t count, bool *values);
00081
00083     Modbus::StatusCode writeMultipleCoilsAsBoolArray(uint16_t offset, uint16_t count, const bool
      *values);
00084
00085 public:
00087     Modbus::StatusCode lastPortStatus() const;
00088
00090     Modbus::StatusCode lastPortErrorStatus() const;
00091
00093     const Modbus::Char *lastPortErrorText() const;
00094
00095 protected:
00097     using ModbusObject::ModbusObject;
00099 };
00100
00101 #endif // MODBUSCLIENT_H
```

8.10 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusClientPort.h File Reference

General file of the algorithm of the client part of the Modbus protocol port.

```
#include "ModbusObject.h"
```

Classes

- class ModbusClientPort

  The `ModbusClientPort` class implements the algorithm of the client part of the Modbus communication protocol port.

8.10.1 Detailed Description

General file of the algorithm of the client part of the Modbus protocol port.

Author

march

Date

May 2024

8.11 ModbusClientPort.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSCLIENTPORT_H
00009 #define MODBUSCLIENTPORT_H
00010
00011 #include "ModbusObject.h"
00012
00013 class ModbusPort;
00014
00054 class MODBUS_EXPORT ModbusClientPort : public ModbusObject, public ModbusInterface
00055 {
00056 public:
00059     enum RequestStatus
00060     {
00061         Enable,
00062         Disable,
00063         Process
00064     };
00065
00066 public:
00069     ModbusClientPort(ModbusPort *port);
00070
00071 public:
00073     Modbus::ProtocolType type() const;
00074
00076     ModbusPort *port() const;
00077
00079     Modbus::StatusCode close();
00080
00082     bool isOpen() const;
00083
00085     uint32_t repeatCount() const;
00086
00088     void setRepeatCount(uint32_t v);
00089
00090 public: // Main interface
00092     Modbus::StatusCode readCoils(ModbusObject *client, uint8_t unit, uint16_t offset, uint16_t count,
      void *values);
00093
00095     Modbus::StatusCode readDiscreteInputs(ModbusObject *client, uint8_t unit, uint16_t offset,
      uint16_t count, void *values);
00096
00098     Modbus::StatusCode readHoldingRegisters(ModbusObject *client, uint8_t unit, uint16_t offset,
      uint16_t count, uint16_t *values);
00099
00101     Modbus::StatusCode readInputRegisters(ModbusObject *client, uint8_t unit, uint16_t offset,
      uint16_t count, uint16_t *values);
00102
00104     Modbus::StatusCode writeSingleCoil(ModbusObject *client, uint8_t unit, uint16_t offset, bool
      value);
00105
00107     Modbus::StatusCode writeSingleRegister(ModbusObject *client, uint8_t unit, uint16_t offset,
      uint16_t value);
00108
00110     Modbus::StatusCode readExceptionStatus(ModbusObject *client, uint8_t unit, uint8_t *value);
00111
00113     Modbus::StatusCode writeMultipleCoils(ModbusObject *client, uint8_t unit, uint16_t offset,
      uint16_t count, const void *values);
00114
00116     Modbus::StatusCode writeMultipleRegisters(ModbusObject *client, uint8_t unit, uint16_t offset,
      uint16_t count, const uint16_t *values);
00117
00119     Modbus::StatusCode readCoilsAsBoolArray(ModbusObject *client, uint8_t unit, uint16_t offset,
      uint16_t count, bool *values);
00120
00122     Modbus::StatusCode readDiscreteInputsAsBoolArray(ModbusObject *client, uint8_t unit, uint16_t
      offset, uint16_t count, bool *values);
00123
00125     Modbus::StatusCode writeMultipleCoilsAsBoolArray(ModbusObject *client, uint8_t unit, uint16_t
      offset, uint16_t count, const bool *values);
00126
00127 public: // Modbus Interface
00128     Modbus::StatusCode readCoils(uint8_t unit, uint16_t offset, uint16_t count, void *values)
      override;
00129     Modbus::StatusCode readDiscreteInputs(uint8_t unit, uint16_t offset, uint16_t count, void *values)
      override;
00130     Modbus::StatusCode readHoldingRegisters(uint8_t unit, uint16_t offset, uint16_t count, uint16_t
      *values) override;
00131     Modbus::StatusCode readInputRegisters(uint8_t unit, uint16_t offset, uint16_t count, uint16_t
      *values) override;
00132     Modbus::StatusCode writeSingleCoil(uint8_t unit, uint16_t offset, bool value) override;
00133     Modbus::StatusCode writeSingleRegister(uint8_t unit, uint16_t offset, uint16_t value) override;
00134     Modbus::StatusCode readExceptionStatus(uint8_t unit, uint8_t *value) override;
```

```
00135     Modbus::StatusCode writeMultipleCoils(uint8_t unit, uint16_t offset, uint16_t count, const void
      *values) override;
00136     Modbus::StatusCode writeMultipleRegisters(uint8_t unit, uint16_t offset, uint16_t count, const
      uint16_t *values) override;
00137
00138 public:
00140     inline Modbus::StatusCode readCoilsAsBoolArray(uint8_t unit, uint16_t offset, uint16_t count, bool
      *values) { return readCoilsAsBoolArray(this, unit, offset, count, values); }
00141
00143     inline Modbus::StatusCode readDiscreteInputsAsBoolArray(uint8_t unit, uint16_t offset, uint16_t
      count, bool *values) { return readDiscreteInputsAsBoolArray(this, unit, offset, count, values); }
00144
00146     inline Modbus::StatusCode writeMultipleCoilsAsBoolArray(uint8_t unit, uint16_t offset, uint16_t
      count, const bool *values) { return writeMultipleCoilsAsBoolArray(this, unit, offset, count, values);
      }
00147
00148 public:
00150     Modbus::StatusCode lastStatus() const;
00151
00153     Modbus::StatusCode lastErrorStatus() const;
00154
00156     const Modbus::Char *lastErrorText() const;
00157
00158 public:
00160     const ModbusObject *currentClient() const;
00161
00167     RequestStatus getRequestStatus(ModbusObject *client);
00168
00170     void cancelRequest(ModbusObject *client);
00171
00172 public: // SIGNALS
00174     void signalOpened(const Modbus::Char *source);
00175
00177     void signalClosed(const Modbus::Char *source);
00178
00180     void signalTx(const Modbus::Char *source, const uint8_t* buff, uint16_t size);
00181
00183     void signalRx(const Modbus::Char *source, const uint8_t* buff, uint16_t size);
00184
00186     void signalError(const Modbus::Char *source, Modbus::StatusCode status, const Modbus::Char *text);
00187
00188 private:
00189     Modbus::StatusCode request(uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff, uint16_t
      maxSzBuff, uint16_t *szOutBuff);
00190     Modbus::StatusCode process();
00191     friend class ModbusClient;
00192 };
00193
00194 #endif // MODBUSCLIENTPORT_H
```

8.12 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusGlobal.h File Reference

Contains general definitions of the Modbus libarary (for C++ and "pure" C).

```
#include <stdint.h>
#include <string.h>
#include "ModbusPlatform.h"
#include "Modbus_config.h"
```

Classes

- struct Modbus::SerialSettings

  Struct to define settings for Serial Port.
- struct Modbus::TcpSettings

  Struct to define settings for TCP connection.

Namespaces

- namespace Modbus

  Main Modbus namespace. Contains classes, functions and constants to work with Modbus-protocol.

Macros

- #define **MODBUSLIB_VERSION** ((MODBUSLIB_VERSION_MAJOR<<16)|(MODBUSLIB_VERSION_↩ MINOR<<8)|(MODBUSLIB_VERSION_PATCH))

  ModbusLib version value that defines as MODBUSLIB_VERSION = (major << 16) + (minor << 8) + patch.
- #define **MODBUSLIB_VERSION_STR** MODBUSLIB_VERSION_STR_MAKE(MODBUSLIB_VERSION_↩ MAJOR,MODBUSLIB_VERSION_MINOR,MODBUSLIB_VERSION_PATCH)

  ModbusLib version value that defines as MODBUSLIB_VERSION_STR "major.minor.patch".
- #define **MODBUS_EXPORT** MB_DECL_IMPORT

  MODBUS_EXPORT defines macro for import/export functions and classes.
- #define **StringLiteral**(cstr) cstr

  Macro for creating string literal, must be used like: `StringLiteral("Some string")`
- #define **CharLiteral**(cchar) cchar

  Macro for creating char literal, must be used like: 'CharLiteral('A')`.
- #define **GET_BIT**(bitBuff, bitNum) ((((const uint8_t*)(bitBuff))[(bitNum)/8] & (1<<((bitNum)%8))) != 0)

  Macro for get bit with number `bitNum` from array `bitBuff`.
- #define SET_BIT(bitBuff, bitNum, value)

  Macro for set bit `value` with number `bitNum` to array `bitBuff`.
- #define GET_BITS(bitBuff, bitNum, bitCount, boolBuff)

  Macro for get bits begins with number `bitNum` with `count` from input bit array `bitBuff` to output bool array `boolBuff`.
- #define SET_BITS(bitBuff, bitNum, bitCount, boolBuff)

  Macro for set bits begins with number `bitNum` with `count` from input bool array `boolBuff`to output bit array `bitBuff`.
- #define **MB_BYTE_SZ_BITES** 8

  8 = count bits in byte (byte size in bits)
- #define **MB_REGE_SZ_BITES** 16

  16 = count bits in 16 bit register (register size in bits)
- #define **MB_REGE_SZ_BYTES** 2

  2 = count bytes in 16 bit register (register size in bytes)
- #define **MB_VALUE_BUFF_SZ** 255

  255 - count_of_bytes in function readHoldingRegisters, readCoils etc
- #define **MB_MAX_REGISTERS** 127

  127 = 255(count_of_bytes in function readHoldingRegisters etc) / 2 (register size in bytes)
- #define **MB_MAX_DISCRETS** 2040

  *2040 = 255(count_of_bytes in function readCoils etc) * 8 (bits in byte)*
- #define MB_RTU_IO_BUFF_SZ 264

  Maximum func data size: WriteMultipleCoils 261 = 1 byte(function) + 2 bytes (starting offset) + 2 bytes (count) + 1 bytes (byte count) + 255 bytes(maximum data length)
- #define **MB_ASC_IO_BUFF_SZ** 529

  *1 byte(start symbol ':')+((1 byte(unit) + 261 (max func data size: WriteMultipleCoils)) + 1 byte(LRC)))*2+2 bytes(CR+LF)*
- #define **MB_TCP_IO_BUFF_SZ** 268

  6 bytes(tcp-prefix)+1 byte(unit)+261 (max func data size: WriteMultipleCoils)

Modbus Functions

Modbus Function's codes.

- #define **MBF_READ_COILS** 1
- #define **MBF_READ_DISCRETE_INPUTS** 2
- #define **MBF_READ_HOLDING_REGISTERS** 3
- #define **MBF_READ_INPUT_REGISTERS** 4
- #define **MBF_WRITE_SINGLE_COIL** 5
- #define **MBF_WRITE_SINGLE_REGISTER** 6
- #define **MBF_READ_EXCEPTION_STATUS** 7
- #define **MBF_DIAGNOSTICS** 8
- #define **MBF_GET_COMM_EVENT_COUNTER** 11
- #define **MBF_GET_COMM_EVENT_LOG** 12
- #define **MBF_WRITE_MULTIPLE_COILS** 15
- #define **MBF_WRITE_MULTIPLE_REGISTERS** 16
- #define **MBF_REPORT_SERVER_ID** 17
- #define **MBF_READ_FILE_RECORD** 20
- #define **MBF_WRITE_FILE_RECORD** 21
- #define **MBF_MASK_WRITE_REGISTER** 22
- #define **MBF_READ_WRITE_MULTIPLE_REGISTERS** 23
- #define **MBF_READ_FIFO_QUEUE** 24
- #define **MBF_ENCAPSULATED_INTERFACE_TRANSPORT** 43
- #define **MBF_ILLEGAL_FUNCTION** 73
- #define **MBF_EXCEPTION** 128

Typedefs

- typedef void * **Modbus::Handle**

  Handle type for native OS values.
- typedef char **Modbus::Char**

  Type for Modbus character.
- typedef uint32_t **Modbus::Timer**

  Type for Modbus timer.
- typedef enum Modbus::_MemoryType **Modbus::MemoryType**

  Defines type of memory used in Modbus protocol.

Enumerations

- enum Modbus::Constants { Modbus::VALID_MODBUS_ADDRESS_BEGIN = 1 , Modbus::VALID_MODBUS_ADDRESS_END = 247 , Modbus::STANDARD_TCP_PORT = 502 }

  Define list of contants of Modbus protocol.
- enum Modbus::_MemoryType { Modbus::Memory_Unknown = 0xFFFF , Modbus::Memory_0x = 0 , Modbus::Memory_Coils = Memory_0x , Modbus::Memory_1x = 1 , Modbus::Memory_DiscreteInputs = Memory_1x , Modbus::Memory_3x = 3 , Modbus::Memory_InputRegisters = Memory_3x , Modbus::Memory_4x = 4 , Modbus::Memory_HoldingRegisters = Memory_4x }

  Defines type of memory used in Modbus protocol.
- enum Modbus::StatusCode { Modbus::Status_Processing = 0x80000000 , Modbus::Status_Good = 0x00000000 , Modbus::Status_Bad = 0x01000000 , Modbus::Status_Uncertain = 0x02000000 , Modbus::Status_BadIllegalFunction = Status_Bad | 0x01 , Modbus::Status_BadIllegalDataAddress = Status_Bad | 0x02 , Modbus::Status_BadIllegalDataValue = Status_Bad | 0x03 , Modbus::Status_BadServerDeviceFailure = Status_Bad | 0x04 ,

Modbus::Status_BadAcknowledge = Status_Bad | 0x05 , Modbus::Status_BadServerDeviceBusy = Status↩
_Bad | 0x06 , Modbus::Status_BadNegativeAcknowledge = Status_Bad | 0x07 , Modbus::Status_BadMemoryParityError
= Status_Bad | 0x08 ,
Modbus::Status_BadGatewayPathUnavailable = Status_Bad | 0x0A , Modbus::Status_BadGatewayTargetDeviceFailedToRespo
= Status_Bad | 0x0B , Modbus::Status_BadEmptyResponse = Status_Bad | 0x101 , Modbus::Status_BadNotCorrectRequest
,
Modbus::Status_BadNotCorrectResponse , Modbus::Status_BadWriteBufferOverflow , Modbus::Status_BadReadBufferOverflo
, Modbus::Status_BadSerialOpen = Status_Bad | 0x201 ,
Modbus::Status_BadSerialWrite , Modbus::Status_BadSerialRead , Modbus::Status_BadAscMissColon =
Status_Bad | 0x301 , Modbus::Status_BadAscMissCrLf ,
Modbus::Status_BadAscChar , Modbus::Status_BadLrc , Modbus::Status_BadCrc = Status_Bad | 0x401 ,
Modbus::Status_BadTcpCreate = Status_Bad | 0x501 ,
Modbus::Status_BadTcpConnect , Modbus::Status_BadTcpWrite , Modbus::Status_BadTcpRead ,
Modbus::Status_BadTcpBind ,
Modbus::Status_BadTcpListen , Modbus::Status_BadTcpAccept , Modbus::Status_BadTcpDisconnect }

Defines status of executed Modbus functions.

- enum Modbus::ProtocolType { Modbus::ASC , Modbus::RTU , Modbus::TCP }

  Defines type of Modbus protocol.
- enum Modbus::Parity {
  Modbus::NoParity , Modbus::EvenParity , Modbus::OddParity , Modbus::SpaceParity ,
  Modbus::MarkParity }

  Defines Parity for serial port.
- enum Modbus::StopBits { Modbus::OneStop , Modbus::OneAndHalfStop , Modbus::TwoStop }

  Defines Stop Bits for serial port.
- enum Modbus::FlowControl { Modbus::NoFlowControl , Modbus::HardwareControl , Modbus::SoftwareControl
  }

  FlowControl Parity for serial port.

Functions

- bool Modbus::StatusIsProcessing (StatusCode status)
- bool Modbus::StatusIsGood (StatusCode status)
- bool Modbus::StatusIsBad (StatusCode status)
- bool Modbus::StatusIsUncertain (StatusCode status)
- bool Modbus::StatusIsStandardError (StatusCode status)
- bool Modbus::getBit (const void *bitBuff, uint16_t bitNum)
- bool Modbus::getBitS (const void *bitBuff, uint16_t bitNum, uint16_t maxBitCount)
- void Modbus::setBit (void *bitBuff, uint16_t bitNum, bool value)
- void Modbus::setBitS (void *bitBuff, uint16_t bitNum, bool value, uint16_t maxBitCount)
- bool * Modbus::getBits (const void *bitBuff, uint16_t bitNum, uint16_t bitCount, bool *boolBuff)
- bool * Modbus::getBitsS (const void *bitBuff, uint16_t bitNum, uint16_t bitCount, bool *boolBuff, uint16_t maxBitCount)
- void * Modbus::setBits (void *bitBuff, uint16_t bitNum, uint16_t bitCount, const bool *boolBuff)
- void * Modbus::setBitsS (void *bitBuff, uint16_t bitNum, uint16_t bitCount, const bool *boolBuff, uint16_t maxBitCount)
- MODBUS_EXPORT uint16_t Modbus::crc16 (const uint8_t *byteArr, uint32_t count)
- MODBUS_EXPORT uint8_t Modbus::lrc (const uint8_t *byteArr, uint32_t count)
- MODBUS_EXPORT StatusCode Modbus::readMemRegs (uint32_t offset, uint32_t count, void *values, const void *memBuff, uint32_t memRegCount)
- MODBUS_EXPORT StatusCode Modbus::writeMemRegs (uint32_t offset, uint32_t count, const void *values, void *memBuff, uint32_t memRegCount)
- MODBUS_EXPORT StatusCode Modbus::readMemBits (uint32_t offset, uint32_t count, void *values, const void *memBuff, uint32_t memBitCount)
- MODBUS_EXPORT StatusCode Modbus::writeMemBits (uint32_t offset, uint32_t count, const void *values, void *memBuff, uint32_t memBitCount)

- MODBUS_EXPORT uint32_t Modbus::bytesToAscii (const uint8_t *bytesBuff, uint8_t *asciiBuff, uint32_t count)
- MODBUS_EXPORT uint32_t Modbus::asciiToBytes (const uint8_t *asciiBuff, uint8_t *bytesBuff, uint32_t count)
- MODBUS_EXPORT Char * Modbus::sbytes (const uint8_t *buff, uint32_t count, Char *str, uint32_t strmaxlen)
- MODBUS_EXPORT Char * Modbus::sascii (const uint8_t *buff, uint32_t count, Char *str, uint32_t strmaxlen)
- MODBUS_EXPORT Timer Modbus::timer ()
- MODBUS_EXPORT void Modbus::msleep (uint32_t msec)

8.12.1 Detailed Description

Contains general definitions of the Modbus libarary (for C++ and "pure" C).

Author

serhmarch

Date

May 2024

8.12.2 Macro Definition Documentation

8.12.2.1 GET_BITS

```
#define GET_BITS(
               bitBuff,
               bitNum,
               bitCount,
               boolBuff )
```

Value:

```
    for (uint16_t __i__ = 0; __i__ < bitCount; __i__++)
      \
        boolBuff[__i__] = (((const uint8_t*)(bitBuff))[((bitNum)+__i__)/8] & (1<<(((bitNum)+__i__)%8))) != 0;
```

Macro for get bits begins with number `bitNum` with `count` from input bit array `bitBuff` to output bool array `boolBuff`.

8.12.2.2 MB_RTU_IO_BUFF_SZ

```
#define MB_RTU_IO_BUFF_SZ 264
```

Maximum func data size: WriteMultipleCoils 261 = 1 byte(function) + 2 bytes (starting offset) + 2 bytes (count) + 1 bytes (byte count) + 255 bytes(maximum data length)

1 byte(unit) + 261 (max func data size: WriteMultipleCoils) + 2 bytes(CRC)

8.12.2.3 SET_BIT

```
#define SET_BIT(
                bitBuff,
                bitNum,
                value )
```

Value:

```
    if (value)
      \
        ((uint8_t*)(bitBuff))[(bitNum)/8] |= (1<<((bitNum)%8));
      \
    else
      \
        ((uint8_t*)(bitBuff))[(bitNum)/8] &= (~(1<<((bitNum)%8)));
```

Macro for set bit `value` with number `bitNum` to array `bitBuff`.

8.12.2.4 SET_BITS

```
#define SET_BITS(
                bitBuff,
                bitNum,
                bitCount,
                boolBuff )
```

Value:

```
    for (uint16_t __i__ = 0; __i__ < bitCount; __i__++)
      \
        if (boolBuff[__i__])
      \
            ((uint8_t*)(bitBuff))[((bitNum)+__i__)/8] |= (1<<(((bitNum)+__i__)%8));
      \
        else
      \
            ((uint8_t*)(bitBuff))[((bitNum)+__i__)/8] &= (~(1<<(((bitNum)+__i__)%8)));
```

Macro for set bits begins with number `bitNum` with `count` from input bool array `boolBuff`to output bit array `bitBuff`.

8.13 ModbusGlobal.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSGLOBAL_H
00009 #define MODBUSGLOBAL_H
00010
00011 #include <stdint.h>
00012 #include <string.h>
00013
00014 #ifdef QT_CORE_LIB
00015 #include <qobjectdefs.h>
00016 #endif
00017
00018 #include "ModbusPlatform.h"
00019 #include "Modbus_config.h"
00020
00022 #define MODBUSLIB_VERSION
      ((MODBUSLIB_VERSION_MAJOR<<16)|(MODBUSLIB_VERSION_MINOR<<8)|(MODBUSLIB_VERSION_PATCH))
00023
00025 #define MODBUSLIB_VERSION_STR_HELPER(major,minor,patch) #major"."#minor"."#patch
00026
00027 #define MODBUSLIB_VERSION_STR_MAKE(major,minor,patch) MODBUSLIB_VERSION_STR_HELPER(major,minor,patch)
00029
00031 #define MODBUSLIB_VERSION_STR
      MODBUSLIB_VERSION_STR_MAKE(MODBUSLIB_VERSION_MAJOR,MODBUSLIB_VERSION_MINOR,MODBUSLIB_VERSION_PATCH)
00032
```

```
00034 #if defined(MODBUS_EXPORTS) && defined(MB_DECL_EXPORT)
00035 #define MODBUS_EXPORT MB_DECL_EXPORT
00036 #elif defined(MB_DECL_IMPORT)
00037 #define MODBUS_EXPORT MB_DECL_IMPORT
00038 #else
00039 #define MODBUS_EXPORT
00040 #endif
00041
00043 #define StringLiteral(cstr) cstr
00044
00046 #define CharLiteral(cchar) cchar
00047
00048 //
     ------------------------------------------------------------------------------------------------------------------
00049 // ---------------------------------------------- Helper macros
     ------------------------------------------------
00050 //
     ------------------------------------------------------------------------------------------------------------------
00051
00053 #define GET_BIT(bitBuff, bitNum) ((((const uint8_t*)(bitBuff))[(bitNum)/8] & (1<<((bitNum)%8))) != 0)
00054
00056 #define SET_BIT(bitBuff, bitNum, value)
     \
00057     if (value)
     \
00058         ((uint8_t*)(bitBuff))[(bitNum)/8] |= (1<<((bitNum)%8));
     \
00059     else
     \
00060         ((uint8_t*)(bitBuff))[(bitNum)/8] &= (~(1<<((bitNum)%8)));
00061
00063 #define GET_BITS(bitBuff, bitNum, bitCount, boolBuff)
     \
00064     for (uint16_t __i__ = 0; __i__ < bitCount; __i__++)
     \
00065         boolBuff[__i__] = (((const uint8_t*)(bitBuff))[((bitNum)+__i__)/8] & (1<<(((bitNum)+__i__)%8)))
     != 0;
00066
00068 #define SET_BITS(bitBuff, bitNum, bitCount, boolBuff)
     \
00069     for (uint16_t __i__ = 0; __i__ < bitCount; __i__++)
     \
00070         if (boolBuff[__i__])
     \
00071             ((uint8_t*)(bitBuff))[((bitNum)+__i__)/8] |= (1<<(((bitNum)+__i__)%8));
     \
00072         else
     \
00073             ((uint8_t*)(bitBuff))[((bitNum)+__i__)/8] &= (~(1<<(((bitNum)+__i__)%8)));
00074
00075
00076 //
     ------------------------------------------------------------------------------------------------------------------
00077 // ---------------------------------------- Modbus function codes
     ----------------------------------------
00078 //
     ------------------------------------------------------------------------------------------------------------------
00079
00083 #define MBF_READ_COILS                          1
00084 #define MBF_READ_DISCRETE_INPUTS                2
00085 #define MBF_READ_HOLDING_REGISTERS              3
00086 #define MBF_READ_INPUT_REGISTERS                4
00087 #define MBF_WRITE_SINGLE_COIL                   5
00088 #define MBF_WRITE_SINGLE_REGISTER               6
00089 #define MBF_READ_EXCEPTION_STATUS               7
00090 #define MBF_DIAGNOSTICS                         8
00091 #define MBF_GET_COMM_EVENT_COUNTER              11
00092 #define MBF_GET_COMM_EVENT_LOG                  12
00093 #define MBF_WRITE_MULTIPLE_COILS                15
00094 #define MBF_WRITE_MULTIPLE_REGISTERS            16
00095 #define MBF_REPORT_SERVER_ID                    17
00096 #define MBF_READ_FILE_RECORD                    20
00097 #define MBF_WRITE_FILE_RECORD                   21
00098 #define MBF_MASK_WRITE_REGISTER                 22
00099 #define MBF_READ_WRITE_MULTIPLE_REGISTERS       23
00100 #define MBF_READ_FIFO_QUEUE                     24
00101 #define MBF_ENCAPSULATED_INTERFACE_TRANSPORT    43
00102 #define MBF_ILLEGAL_FUNCTION                    73
00103 #define MBF_EXCEPTION                           128
00105
00106
00107 //
     ------------------------------------------------------------------------------------------------------------------
00108 // ---------------------------------------- Modbus count constants
     ----------------------------------------
00109 //
     ------------------------------------------------------------------------------------------------------------------
```

```
00110
00112 #define MB_BYTE_SZ_BITES 8
00113
00115 #define MB_REGE_SZ_BITES 16
00116
00118 #define MB_REGE_SZ_BYTES 2
00119
00121 #define MB_VALUE_BUFF_SZ 255
00122
00124 #define MB_MAX_REGISTERS 127
00125
00127 #define MB_MAX_DISCRETS 2040
00128
00131
00133 #define MB_RTU_IO_BUFF_SZ 264
00134
00136 #define MB_ASC_IO_BUFF_SZ 529
00137
00139 #define MB_TCP_IO_BUFF_SZ 268
00140
00141 #ifdef __cplusplus
00142
00143 namespace Modbus {
00144
00145 #ifdef QT_CORE_LIB
00146 Q_NAMESPACE
00147 #endif
00148
00149 #endif // __cplusplus
00150
00152 typedef void* Handle;
00153
00155 typedef char Char;
00156
00158 typedef uint32_t Timer;
00159
00161 enum Constants
00162 {
00163     VALID_MODBUS_ADDRESS_BEGIN = 1   ,
00164     VALID_MODBUS_ADDRESS_END   = 247,
00165     STANDARD_TCP_PORT          = 502
00166 };
00167
00168 //=========== Modbus protocol types ===============
00169
00171 typedef enum _MemoryType
00172 {
00173     Memory_Unknown = 0xFFFF,
00174     Memory_0x = 0,
00175     Memory_Coils = Memory_0x,
00176     Memory_1x = 1,
00177     Memory_DiscreteInputs = Memory_1x,
00178     Memory_3x = 3,
00179     Memory_InputRegisters = Memory_3x,
00180     Memory_4x = 4,
00181     Memory_HoldingRegisters = Memory_4x,
00182 } MemoryType;
00183
00185 #ifdef __cplusplus // Note: for Qt/moc support
00186 enum StatusCode
00187 #else
00188 typedef enum _StatusCode
00189 #endif
00190 {
00191     Status_Processing              = 0x80000000,
00192     Status_Good                    = 0x00000000,
00193     Status_Bad                     = 0x01000000,
00194     Status_Uncertain               = 0x02000000,
00195
00196     //------ Modbus standart errors begin -------
00197     // from 0 to 255
00198     Status_BadIllegalFunction                   = Status_Bad | 0x01,
00199     Status_BadIllegalDataAddress                = Status_Bad | 0x02,
00200     Status_BadIllegalDataValue                  = Status_Bad | 0x03,
00201     Status_BadServerDeviceFailure               = Status_Bad | 0x04,
00202     Status_BadAcknowledge                       = Status_Bad | 0x05,
00203     Status_BadServerDeviceBusy                  = Status_Bad | 0x06,
00204     Status_BadNegativeAcknowledge               = Status_Bad | 0x07,
00205     Status_BadMemoryParityError                 = Status_Bad | 0x08,
00206     Status_BadGatewayPathUnavailable            = Status_Bad | 0x0A,
00207     Status_BadGatewayTargetDeviceFailedToRespond = Status_Bad | 0x0B,
00208     //------- Modbus standart errors end --------
00209
00210     //------- Modbus common errors begin --------
00211     Status_BadEmptyResponse         = Status_Bad | 0x101,
00212     Status_BadNotCorrectRequest     ,
00213     Status_BadNotCorrectResponse    ,
```

```
00214     Status_BadWriteBufferOverflow   ,
00215     Status_BadReadBufferOverflow    ,
00216
00217     //-------- Modbus common errors end ---------
00218
00219     //--_ Modbus serial specified errors begin --
00220     Status_BadSerialOpen            = Status_Bad | 0x201,
00221     Status_BadSerialWrite           ,
00222     Status_BadSerialRead            ,
00223     //---_ Modbus serial specified errors end ---
00224
00225     //---- Modbus ASC specified errors begin ----
00226     Status_BadAscMissColon          = Status_Bad | 0x301,
00227     Status_BadAscMissCrLf           ,
00228     Status_BadAscChar               ,
00229     Status_BadLrc                   ,
00230     //---- Modbus ASC specified errors end ----
00231
00232     //---- Modbus RTU specified errors begin ----
00233     Status_BadCrc                   = Status_Bad | 0x401,
00234     //----- Modbus RTU specified errors end -----
00235
00236     //--_ Modbus TCP specified errors begin --
00237     Status_BadTcpCreate             = Status_Bad | 0x501,
00238     Status_BadTcpConnect,
00239     Status_BadTcpWrite,
00240     Status_BadTcpRead,
00241     Status_BadTcpBind,
00242     Status_BadTcpListen,
00243     Status_BadTcpAccept,
00244     Status_BadTcpDisconnect,
00245     //---_ Modbus TCP specified errors end ---
00246 }
00247 #ifdef __cplusplus
00248 ;
00249 #else
00250 StatusCode;
00251 #endif
00252
00254 #ifdef __cplusplus // Note: for Qt/moc support
00255 enum ProtocolType
00256 #else
00257 typedef enum _ProtocolType
00258 #endif
00259 {
00260     ASC,
00261     RTU,
00262     TCP
00263 }
00264 #ifdef __cplusplus
00265 ;
00266 #else
00267 ProtocolType;
00268 #endif
00269
00270
00272 #ifdef __cplusplus // Note: for Qt/moc support
00273 enum Parity
00274 #else
00275 typedef enum _Parity
00276 #endif
00277 {
00278     NoParity,
00279     EvenParity,
00280     OddParity,
00281     SpaceParity,
00282     MarkParity
00283 }
00284 #ifdef __cplusplus
00285 ;
00286 #else
00287 Parity;
00288 #endif
00289
00290
00292 #ifdef __cplusplus // Note: for Qt/moc support
00293 enum StopBits
00294 #else
00295 typedef enum _StopBits
00296 #endif
00297 {
00298     OneStop,
00299     OneAndHalfStop,
00300     TwoStop
00301 }
00302 #ifdef __cplusplus
00303 ;
```

```
00304 #else
00305 StopBits;
00306 #endif
00307
00309 #ifdef __cplusplus // Note: for Qt/moc support
00310 enum FlowControl
00311 #else
00312 typedef enum _FlowControl
00313 #endif
00314 {
00315     NoFlowControl,
00316     HardwareControl,
00317     SoftwareControl
00318 }
00319 #ifdef __cplusplus
00320 ;
00321 #else
00322 FlowControl;
00323 #endif
00324
00325 #ifdef QT_CORE_LIB
00326 Q_ENUM_NS(StatusCode)
00327 Q_ENUM_NS(ProtocolType)
00328 Q_ENUM_NS(Parity)
00329 Q_ENUM_NS(StopBits)
00330 Q_ENUM_NS(FlowControl)
00331 #endif
00332
00334 typedef struct
00335 {
00336     const Char *portName        ;
00337     int32_t     baudRate        ;
00338     int8_t      dataBits        ;
00339     Parity      parity          ;
00340     StopBits    stopBits        ;
00341     FlowControl flowControl     ;
00342     uint32_t    timeoutFirstByte;
00343     uint32_t    timeoutInterByte;
00344 } SerialSettings;
00345
00347 typedef struct
00348 {
00349     const Char *host   ;
00350     uint16_t    port   ;
00351     uint16_t    timeout;
00352 } TcpSettings;
00353
00354 #ifdef __cplusplus
00355 extern "C" {
00356 #endif
00357
00359 inline bool StatusIsProcessing(StatusCode status) { return status == Status_Processing; }
00360
00362 inline bool StatusIsGood(StatusCode status) { return status == Status_Good; }
00363
00365 inline bool StatusIsBad(StatusCode status) { return (status & Status_Bad) != 0; }
00366
00368 inline bool StatusIsUncertain(StatusCode status) { return (status & Status_Uncertain) != 0; }
00369
00371 inline bool StatusIsStandardError(StatusCode status) { return (status & Status_Bad) && ((status &
      0xFF00) == 0); }
00372
00374 inline bool getBit(const void *bitBuff, uint16_t bitNum) { return GET_BIT (bitBuff, bitNum); }
00375
00377 inline bool getBitS(const void *bitBuff, uint16_t bitNum, uint16_t maxBitCount) { return (bitNum <
      maxBitCount) ? getBit(bitBuff, bitNum) : false; }
00378
00380 inline void setBit(void *bitBuff, uint16_t bitNum, bool value) { SET_BIT (bitBuff, bitNum, value) }
00381
00383 inline void setBitS(void *bitBuff, uint16_t bitNum, bool value, uint16_t maxBitCount) { if (bitNum <
      maxBitCount) setBit(bitBuff, bitNum, value); }
00384
00388 inline bool *getBits(const void *bitBuff, uint16_t bitNum, uint16_t bitCount, bool *boolBuff) {
      GET_BITS(bitBuff, bitNum, bitCount, boolBuff) return boolBuff; }
00389
00392 inline bool *getBitsS(const void *bitBuff, uint16_t bitNum, uint16_t bitCount, bool *boolBuff,
      uint16_t maxBitCount) { if ((bitNum+bitCount) <= maxBitCount) getBits(bitBuff, bitNum, bitCount,
      boolBuff); return boolBuff; }
00393
00397 inline void *setBits(void *bitBuff, uint16_t bitNum, uint16_t bitCount, const bool *boolBuff) {
      SET_BITS(bitBuff, bitNum, bitCount, boolBuff) return bitBuff; }
00398
00401 inline void *setBitsS(void *bitBuff, uint16_t bitNum, uint16_t bitCount, const bool *boolBuff,
      uint16_t maxBitCount) { if ((bitNum + bitCount) <= maxBitCount) setBits(bitBuff, bitNum, bitCount,
      boolBuff); return bitBuff; }
00402
00405 MODBUS_EXPORT uint16_t crc16(const uint8_t *byteArr, uint32_t count);
```

```
00406
00409 MODBUS_EXPORT uint8_t lrc(const uint8_t *byteArr, uint32_t count);
00410
00417 MODBUS_EXPORT StatusCode readMemRegs(uint32_t offset, uint32_t count, void *values, const void
      *memBuff, uint32_t memRegCount);
00418
00425 MODBUS_EXPORT StatusCode writeMemRegs(uint32_t offset, uint32_t count, const void *values, void
      *memBuff, uint32_t memRegCount);
00426
00433 MODBUS_EXPORT StatusCode readMemBits(uint32_t offset, uint32_t count, void *values, const void
      *memBuff, uint32_t memBitCount);
00434
00441 MODBUS_EXPORT StatusCode writeMemBits(uint32_t offset, uint32_t count, const void *values, void
      *memBuff, uint32_t memBitCount);
00442
00450 MODBUS_EXPORT uint32_t bytesToAscii(const uint8_t* bytesBuff, uint8_t* asciiBuff, uint32_t count);
00451
00459 MODBUS_EXPORT uint32_t asciiToBytes(const uint8_t* asciiBuff, uint8_t* bytesBuff, uint32_t count);
00460
00462 MODBUS_EXPORT Char *sbytes(const uint8_t* buff, uint32_t count, Char *str, uint32_t strmaxlen);
00463
00465 MODBUS_EXPORT Char *sascii(const uint8_t* buff, uint32_t count, Char *str, uint32_t strmaxlen);
00466
00468 MODBUS_EXPORT Timer timer();
00469
00471 MODBUS_EXPORT void msleep(uint32_t msec);
00472
00473 #ifdef __cplusplus
00474 } //extern "C"
00475 #endif
00476
00477 #ifdef __cplusplus
00478 } //namespace Modbus
00479 #endif
00480
00481 #endif // MODBUSGLOBAL_H
```

8.14 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusObject.h File Reference

The header file defines the class templates used to create signal/slot-like mechanism.

```
#include "Modbus.h"
```

Classes

- class ModbusSlotBase< ReturnType, Args >

  ModbusSlotBase base template for slot (method or function)
- class ModbusSlotMethod< T, ReturnType, Args >

  ModbusSlotMethod template class hold pointer to object and its method
- class ModbusSlotFunction< ReturnType, Args >

  ModbusSlotFunction template class hold pointer to slot function
- class ModbusObject

  The ModbusObject class is the base class for objects that use signal/slot mechanism.

Typedefs

- template<class T , class ReturnType , class ... Args>
  using **ModbusMethodPointer** = ReturnType(T::*)(Args...)

  ModbusMethodPointer-pointer to class method template type
- template<class ReturnType , class ... Args>
  using **ModbusFunctionPointer** = ReturnType (*)(Args...)

  ModbusFunctionPointer pointer to function template type

8.14.1 Detailed Description

The header file defines the class templates used to create signal/slot-like mechanism.

Author

march

Date

May 2024

8.15 ModbusObject.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSOBJECT_H
00009 #define MODBUSOBJECT_H
00010
00011 #include "Modbus.h"
00012
00014 template <class T, class ReturnType, class ... Args>
00015 using ModbusMethodPointer = ReturnType(T::*)(Args...);
00016
00018 template <class ReturnType, class ... Args>
00019 using ModbusFunctionPointer = ReturnType (*)(Args...);
00020
00022 template <class ReturnType, class ... Args>
00023 class ModbusSlotBase
00024 {
00025 public:
00027     virtual ~ModbusSlotBase() {}
00028
00031     virtual void *object() const { return nullptr; }
00032
00034     virtual void *methodOrFunction() const = 0;
00035
00037     virtual ReturnType exec(Args ...  args) = 0;
00038 };
00039
00040
00041
00043 template <class T, class ReturnType, class ... Args>
00044 class ModbusSlotMethod : public ModbusSlotBase<ReturnType, Args ...>
00045 {
00046 public:
00050     ModbusSlotMethod(T* object, ModbusMethodPointer<T, ReturnType, Args...> methodPtr) :
      m_object(object), m_methodPtr(methodPtr) {}
00051
00052 public:
00053     void *object() const override { return m_object; }
00054     void *methodOrFunction() const override { return reinterpret_cast<void*>(m_voidPtr); }
00055
00056     ReturnType exec(Args ...  args) override
00057     {
00058         return (m_object->*m_methodPtr)(args...);
00059     }
00060
00061 private:
00062     T* m_object;
00063     union
00064     {
00065         ModbusMethodPointer<T, ReturnType, Args...> m_methodPtr;
00066         void *m_voidPtr;
00067     };
00068 };
00069
00070
00072 template <class ReturnType, class ... Args>
00073 class ModbusSlotFunction : public ModbusSlotBase<ReturnType, Args ...>
00074 {
00075 public:
00078     ModbusSlotFunction(ModbusFunctionPointer<ReturnType, Args...> funcPtr) : m_funcPtr(funcPtr) {}
00079
```

```
00080 public:
00081     void *methodOrFunction() const override { return m_voidPtr; }
00082     ReturnType exec(Args ...  args) override
00083     {
00084         return m_funcPtr(args...);
00085     }
00086
00087 private:
00088     union
00089     {
00090         ModbusFunctionPointer<ReturnType, Args...> m_funcPtr;
00091         void *m_voidPtr;
00092     };
00093 };
00094
00095 class ModbusObjectPrivate;
00096
00114 class MODBUS_EXPORT ModbusObject
00115 {
00116 public:
00120     static ModbusObject *sender();
00121
00122 public:
00124     ModbusObject();
00125
00127     virtual ~ModbusObject();
00128
00129 public:
00131     const Modbus::Char *objectName() const;
00132
00134     void setObjectName(const Modbus::Char *name);
00135
00136 public:
00147     template <class SignalClass, class T, class ReturnType, class ... Args>
00148     void connect(ModbusMethodPointer<SignalClass, ReturnType, Args ...> signalMethodPtr, T *object,
      ModbusMethodPointer<T, ReturnType, Args ...> objectMethodPtr)
00149     {
00150         ModbusSlotMethod<T, ReturnType, Args ...> *slotMethod = new ModbusSlotMethod<T, ReturnType,
      Args ...>(object, objectMethodPtr);
00151         union {
00152             ModbusMethodPointer<SignalClass, ReturnType, Args ...> signalMethodPtr;
00153             void* voidPtr;
00154         } converter;
00155         converter.signalMethodPtr = signalMethodPtr;
00156         setSlot(converter.voidPtr, slotMethod);
00157     }
00158
00161     template <class SignalClass, class ReturnType, class ... Args>
00162     void connect(ModbusMethodPointer<SignalClass, ReturnType, Args ...> signalMethodPtr,
      ModbusFunctionPointer<ReturnType, Args ...> funcPtr)
00163     {
00164         ModbusSlotFunction<ReturnType, Args ...> *slotFunc = new ModbusSlotFunction<ReturnType, Args
      ...>(funcPtr);
00165         union {
00166             ModbusMethodPointer<SignalClass, ReturnType, Args ...> signalMethodPtr;
00167             void* voidPtr;
00168         } converter;
00169         converter.signalMethodPtr = signalMethodPtr;
00170         setSlot(converter.voidPtr, slotFunc);
00171     }
00172
00174     template <class ReturnType, class ... Args>
00175     inline void disconnect(ModbusFunctionPointer<ReturnType, Args ...> funcPtr)
00176     {
00177         disconnect(nullptr, funcPtr);
00178     }
00179
00181     inline void disconnectFunc(void *funcPtr)
00182     {
00183         disconnect(nullptr, funcPtr);
00184     }
00185
00187     template <class T, class ReturnType, class ... Args>
00188     inline void disconnect(T *object, ModbusMethodPointer<T, ReturnType, Args ...> objectMethodPtr)
00189     {
00190         union {
00191             ModbusMethodPointer<T, ReturnType, Args ...> objectMethodPtr;
00192             void* voidPtr;
00193         } converter;
00194         converter.objectMethodPtr = objectMethodPtr;
00195         disconnect(object, converter.voidPtr);
00196     }
00197
00199     template <class T>
00200     inline void disconnect(T *object)
00201     {
00202         disconnect(object, nullptr);
```

```
00203     }
00204
00205
00206 protected:
00208     template <class T, class ... Args>
00209     void emitSignal(const char *thisMethodId, ModbusMethodPointer<T, void, Args ...> thisMethod, Args
      ... args)
00210     {
00211         dummy = thisMethodId; // Note: present because of weird MSVC compiler optimization,
00212                               // when diff signals can have same address
00213         //printf("Emit signal: %s\n", thisMethodId);
00214         union {
00215             ModbusMethodPointer<T, void, Args ...> thisMethod;
00216             void* voidPtr;
00217         } converter;
00218         converter.thisMethod = thisMethod;
00219
00220         pushSender(this);
00221         int i = 0;
00222         while (void* itemSlot = slot(converter.voidPtr, i++))
00223         {
00224             ModbusSlotBase<void, Args...> *slotBase = reinterpret_cast<ModbusSlotBase<void, Args...>
      *>(itemSlot);
00225             slotBase->exec(args...);
00226         }
00227         popSender();
00228     }
00229
00230 private:
00231     void *slot(void *signalMethodPtr, int i) const;
00232     void setSlot(void *signalMethodPtr, void *slotPtr);
00233     void disconnect(void *object, void *methodOrFunc);
00234
00235 private:
00236     static void pushSender(ModbusObject *sender);
00237     static void popSender();
00238
00239 protected:
00241     static const char* dummy; // Note: prevent weird MSVC compiler optimization
00242     ModbusObjectPrivate *d_ptr;
00243     ModbusObject(ModbusObjectPrivate *d);
00245 };
00246
00247 #endif // MODBUSOBJECT_H
```

8.16 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusPlatform.h File Reference

Definition of platform specific macros.

8.16.1 Detailed Description

Definition of platform specific macros.

Author

serhmarch

Date

May 2024

8.17 ModbusPlatform.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSPLATFORM_H
00009 #define MODBUSPLATFORM_H
00010
00011 #if defined (_WIN32)|| defined(_WIN64)|| defined(__WIN32__) || defined(__WINDOWS__)
00012 #define MB_OS_WINDOWS
00013 #endif
00014
00015 // Linux, BSD and Solaris define "unix", OSX doesn't, even though it derives from BSD
00016 #if defined(unix) || defined(__unix__) || defined(__unix)
00017 #define MB_PLATFORM_UNIX
00018 #endif
00019
00020 #if BSD>=0
00021 #define MB_OS_BSD
00022 #endif
00023
00024 #if __APPLE__
00025 #define MB_OS_OSX
00026 #endif
00027
00028
00029 #ifdef _MSC_VER
00030
00031 #define MB_DECL_IMPORT __declspec (dllimport)
00032 #define MB_DECL_EXPORT __declspec (dllexport)
00033
00034 #else
00035
00036 #define MB_DECL_IMPORT
00037 #define MB_DECL_EXPORT
00038
00039 #endif
00040
00041 #endif // MODBUSPLATFORM_H
```

8.18 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusPort.h File Reference

Header file of abstract class `ModbusPort`.

```
#include <string>
#include <list>
#include "Modbus.h"
```

Classes

- class ModbusPort

  The abstract class `ModbusPort` is the base class for a specific implementation of the Modbus communication protocol.

8.18.1 Detailed Description

Header file of abstract class `ModbusPort`.

Author

march

Date

May 2024

8.19 ModbusPort.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSPORT_H
00009 #define MODBUSPORT_H
00010
00011 #include <string>
00012 #include <list>
00013
00014 #include "Modbus.h"
00015
00016 class ModbusPortPrivate;
00017
00024 class MODBUS_EXPORT ModbusPort
00025 {
00026 public:
00028     virtual ~ModbusPort();
00029
00030 public:
00032     virtual Modbus::ProtocolType type() const = 0;
00033
00035     virtual Modbus::Handle handle() const = 0;
00036
00038     virtual Modbus::StatusCode open() = 0;
00039
00041     virtual Modbus::StatusCode close() = 0;
00042
00044     virtual bool isOpen() const = 0;
00045
00048     virtual void setNextRequestRepeated(bool v);
00049
00050 public:
00052     bool isChanged() const;
00053
00055     bool isServerMode() const;
00056
00058     virtual void setServerMode(bool mode);
00059
00061     bool isBlocking() const;
00062
00064     bool isNonBlocking() const;
00065
00066 public: // errors
00068     Modbus::StatusCode lastErrorStatus() const;
00069
00071     const Modbus::Char *lastErrorText() const;
00072
00073 public:
00075     virtual Modbus::StatusCode writeBuffer(uint8_t unit, uint8_t func, uint8_t *buff, uint16_t
      szInBuff) = 0;
00076
00078     virtual Modbus::StatusCode readBuffer(uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t
      maxSzBuff, uint16_t *szOutBuff) = 0;
00079
00081     virtual Modbus::StatusCode write() = 0;
00082
00084     virtual Modbus::StatusCode read() = 0;
00085
00086 public: // buffer
00088     virtual const uint8_t *readBufferData() const = 0;
00089
00091     virtual uint16_t readBufferSize() const = 0;
00092
00094     virtual const uint8_t *writeBufferData() const = 0;
00095
00097     virtual uint16_t writeBufferSize() const = 0;
00098
00099 protected:
00101     Modbus::StatusCode setError(Modbus::StatusCode status, const Modbus::Char *text);
00102
00103 protected:
00105     ModbusPortPrivate *d_ptr;
00106     ModbusPort(ModbusPortPrivate *d);
00108 };
00109
00110 #endif // MODBUSPORT_H
```

8.20 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusQt.h File Reference

Qt support file for ModbusLib.

```
#include "Modbus.h"
#include <QMetaEnum>
#include <QHash>
#include <QVariant>
```

Classes

- class Modbus::Strings

  Sets constant key values for the map of settings.
- class Modbus::Defaults

  Holds the default values of the settings.
- class Modbus::Address

  Class for convinient manipulation with Modbus Data Address.

Namespaces

- namespace Modbus

  Main Modbus namespace. Contains classes, functions and constants to work with Modbus-protocol.

Typedefs

- typedef QHash< QString, QVariant > **Modbus::Settings**

  Map for settings of Modbus protocol where key has type `QString` and value is `QVariant`.

Functions

- Address Modbus::addressFromString (const QString &s)
- template<class EnumType >
  QString Modbus::enumKey (int value)
- template<class EnumType >
  QString Modbus::enumKey (EnumType value, const QString &byDef=QString())
- template<class EnumType >
  EnumType Modbus::enumValue (const QString &key, bool *ok=nullptr)
- template<class EnumType >
  EnumType Modbus::enumValue (const QVariant &value, bool *ok)
- template<class EnumType >
  EnumType Modbus::enumValue (const QVariant &value, EnumType defaultValue)
- template<class EnumType >
  EnumType Modbus::enumValue (const QVariant &value)
- MODBUS_EXPORT ProtocolType Modbus::toProtocolType (const QString &s, bool *ok=nullptr)
- MODBUS_EXPORT ProtocolType Modbus::toProtocolType (const QVariant &v, bool *ok=nullptr)
- MODBUS_EXPORT Parity Modbus::toParity (const QString &s, bool *ok=nullptr)
- MODBUS_EXPORT Parity Modbus::toParity (const QVariant &v, bool *ok=nullptr)
- MODBUS_EXPORT StopBits Modbus::toStopBits (const QString &s, bool *ok=nullptr)

- MODBUS_EXPORT StopBits Modbus::toStopBits (const QVariant &v, bool *ok=nullptr)
- MODBUS_EXPORT FlowControl Modbus::toFlowControl (const QString &s, bool *ok=nullptr)
- MODBUS_EXPORT FlowControl Modbus::toFlowControl (const QVariant &v, bool *ok=nullptr)
- MODBUS_EXPORT QString Modbus::toString (StatusCode v)
- MODBUS_EXPORT QString Modbus::toString (ProtocolType v)
- MODBUS_EXPORT QString Modbus::toString (Parity v)
- MODBUS_EXPORT QString Modbus::toString (StopBits v)
- MODBUS_EXPORT QString Modbus::toString (FlowControl v)
- MODBUS_EXPORT QStringList Modbus::availableSerialPortList ()
- MODBUS_EXPORT ModbusPort * Modbus::createPort (const Settings &settings, bool blocking=false)
- MODBUS_EXPORT ModbusClientPort * Modbus::createClientPort (const Settings &settings, bool blocking=false)
- MODBUS_EXPORT ModbusServerPort * Modbus::createServerPort (ModbusInterface *device, const Settings &settings, bool blocking=false)

8.20.1 Detailed Description

Qt support file for ModbusLib.

Author

serhmarch

Date

May 2024

8.21 ModbusQt.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSQT_H
00009 #define MODBUSQT_H
00010
00011 #include "Modbus.h"
00012
00013 #include <QMetaEnum>
00014 #include <QHash>
00015 #include <QVariant>
00016
00017 namespace Modbus {
00018
00020 typedef QHash<QString, QVariant> Settings;
00021
00024 class MODBUS_EXPORT Strings
00025 {
00026 public:
00027     const QString unit            ;
00028     const QString type            ;
00029     const QString host            ;
00030     const QString port            ;
00031     const QString timeout         ;
00032     const QString serialPortName  ;
00033     const QString baudRate        ;
00034     const QString dataBits        ;
00035     const QString parity          ;
00036     const QString stopBits        ;
00037     const QString flowControl     ;
00038     const QString timeoutFirstByte;
00039     const QString timeoutInterByte;
00040
00042     Strings();
00043
00045     static const Strings &instance();
```

```
00046 };
00047
00050 class MODBUS_EXPORT Defaults
00051 {
00052 public:
00053     const uint8_t      unit            ;
00054     const ProtocolType type            ;
00055     const QString      host            ;
00056     const uint16_t     port            ;
00057     const uint32_t     timeout         ;
00058     const QString      serialPortName  ;
00059     const int32_t      baudRate        ;
00060     const int8_t       dataBits        ;
00061     const Parity       parity          ;
00062     const StopBits     stopBits        ;
00063     const FlowControl  flowControl     ;
00064     const uint32_t     timeoutFirstByte;
00065     const uint32_t     timeoutInterByte;
00066
00068     Defaults();
00069
00071     static const Defaults &instance();
00072 };
00073
00076 class MODBUS_EXPORT Address
00077 {
00078 public:
00080     Address();
00081
00083     Address(Modbus::MemoryType, quint16 offset);
00084
00087     Address(quint32 adr);
00088
00089 public:
00091     inline bool isValid() const { return m_type != Memory_Unknown; }
00092
00094     inline MemoryType type() const { return static_cast<MemoryType>(m_type); }
00095
00097     inline quint16 offset() const { return m_offset; }
00098
00100     inline quint32 number() const { return m_offset+1; }
00101
00104     QString toString() const;
00105
00108     inline operator quint32 () const { return number() | (m_type<<16);  }
00109
00111     Address &operator= (quint32 v);
00112
00113 private:
00114     quint16 m_type;
00115     quint16 m_offset;
00116 };
00117
00119 inline Address addressFromString(const QString &s) { return Address(s.toUInt()); }
00120
00122 template <class EnumType>
00123 inline QString enumKey(int value)
00124 {
00125     const QMetaEnum me = QMetaEnum::fromType<EnumType>();
00126     return QString(me.valueToKey(value));
00127 }
00128
00130 template <class EnumType>
00131 inline QString enumKey(EnumType value, const QString &byDef = QString())
00132 {
00133     const QMetaEnum me = QMetaEnum::fromType<EnumType>();
00134     const char *key = me.valueToKey(value);
00135     if (key)
00136         return QString(me.valueToKey(value));
00137     else
00138         return byDef;
00139 }
00140
00142 template <class EnumType>
00143 inline EnumType enumValue(const QString& key, bool* ok = nullptr)
00144 {
00145     const QMetaEnum me = QMetaEnum::fromType<EnumType>();
00146     return static_cast<EnumType>(me.keyToValue(key.toLatin1().constData(), ok));
00147
00148 }
00149
00152 template <class EnumType>
00153 inline EnumType enumValue(const QVariant& value, bool *ok)
00154 {
00155     bool okInner;
00156     int v = value.toInt(&okInner);
00157     if (okInner)
```

```
00158     {
00159         const QMetaEnum me = QMetaEnum::fromType<EnumType>();
00160         if (me.valueToKey(v)) // check value exists
00161         {
00162             if (ok)
00163                 *ok = true;
00164             return static_cast<EnumType>(v);
00165         }
00166         if (ok)
00167             *ok = false;
00168         return static_cast<EnumType>(-1);
00169     }
00170     return enumValue<EnumType>(value.toString(), ok);
00171 }
00172
00175 template <class EnumType>
00176 inline EnumType enumValue(const QVariant& value, EnumType defaultValue)
00177 {
00178     bool okInner;
00179     EnumType v = enumValue<EnumType>(value, &okInner);
00180     if (okInner)
00181         return v;
00182     return defaultValue;
00183 }
00184
00186 template <class EnumType>
00187 inline EnumType enumValue(const QVariant& value)
00188 {
00189     return enumValue<EnumType>(value, nullptr);
00190 }
00191
00194 MODBUS_EXPORT ProtocolType toProtocolType(const QString &s, bool *ok = nullptr);
00195
00198 MODBUS_EXPORT ProtocolType toProtocolType(const QVariant &v, bool *ok = nullptr);
00199
00202 MODBUS_EXPORT Parity toParity(const QString &s, bool *ok = nullptr);
00203
00206 MODBUS_EXPORT Parity toParity(const QVariant &v, bool *ok = nullptr);
00207
00210 MODBUS_EXPORT StopBits toStopBits(const QString &s, bool *ok = nullptr);
00211
00214 MODBUS_EXPORT StopBits toStopBits(const QVariant &v, bool *ok = nullptr);
00215
00218 MODBUS_EXPORT FlowControl toFlowControl(const QString &s, bool *ok = nullptr);
00219
00222 MODBUS_EXPORT FlowControl toFlowControl(const QVariant &v, bool *ok = nullptr);
00223
00225 MODBUS_EXPORT QString toString(StatusCode v);
00226
00228 MODBUS_EXPORT QString toString(ProtocolType v);
00229
00231 MODBUS_EXPORT QString toString(Parity v);
00232
00234 MODBUS_EXPORT QString toString(StopBits v);
00235
00237 MODBUS_EXPORT QString toString(FlowControl v);
00238
00240 MODBUS_EXPORT QStringList availableSerialPortList();
00241
00244 MODBUS_EXPORT ModbusPort *createPort(const Settings &settings, bool blocking = false);
00245
00248 MODBUS_EXPORT ModbusClientPort *createClientPort(const Settings &settings, bool blocking = false);
00249
00252 MODBUS_EXPORT ModbusServerPort *createServerPort(ModbusInterface *device, const Settings &settings,
      bool blocking = false);
00253
00254 } // namespace Modbus
00255
00256 #endif // MODBUSQT_H
```

8.22 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusRtuPort.h File Reference

Contains definition of RTU serial port class.

```
#include "ModbusSerialPort.h"
```

Classes

- class ModbusRtuPort

  Implements RTU version of the Modbus communication protocol.

8.22.1 Detailed Description

Contains definition of RTU serial port class.

Author

serhmarch

Date

May 2024

8.23 ModbusRtuPort.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSRTUPORT_H
00009 #define MODBUSRTUPORT_H
00010
00011 #include "ModbusSerialPort.h"
00012
00019 class MODBUS_EXPORT ModbusRtuPort : public ModbusSerialPort
00020 {
00021 public:
00023     ModbusRtuPort(bool blocking = false);
00024
00026     ~ModbusRtuPort();
00027
00028 public:
00030     Modbus::ProtocolType type() const override { return Modbus::RTU; }
00031
00032 protected:
00033     Modbus::StatusCode writeBuffer(uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff)
      override;
00034     Modbus::StatusCode readBuffer(uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t maxSzBuff,
      uint16_t *szOutBuff) override;
00035
00036 protected:
00037     using ModbusSerialPort::ModbusSerialPort;
00038 };
00039
00040 #endif // MODBUSRTUPORT_H
```

8.24 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusSerialPort.h File Reference

Contains definition of base serial port class.

```
#include "ModbusPort.h"
```

Classes

- class ModbusSerialPort

  The abstract class `ModbusSerialPort` is the base class serial port Modbus communications.
- struct ModbusSerialPort::Defaults

  Holds the default values of the settings.

8.24.1 Detailed Description

Contains definition of base serial port class.

Author

serhmarch

Date

May 2024

8.25 ModbusSerialPort.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSSERIALPORT_H
00009 #define MODBUSSERIALPORT_H
00010
00011 #include "ModbusPort.h"
00012
00020 class MODBUS_EXPORT ModbusSerialPort : public ModbusPort
00021 {
00022 public:
00025     struct MODBUS_EXPORT Defaults
00026     {
00027         const Modbus::Char       *portName        ;
00028         const int32_t             baudRate        ;
00029         const int8_t              dataBits        ;
00030         const Modbus::Parity      parity          ;
00031         const Modbus::StopBits    stopBits        ;
00032         const Modbus::FlowControl flowControl     ;
00033         const uint32_t            timeoutFirstByte;
00034         const uint32_t            timeoutInterByte;
00035
00037         Defaults();
00038
00040         static const Defaults &instance();
00041     };
00042
00043 public:
00045     Modbus::Handle handle() const override;
00046
00048     Modbus::StatusCode open() override;
00049
00051     Modbus::StatusCode close() override;
00052
00054     bool isOpen() const override;
00055
00056 public: // settings
00058     const Modbus::Char *portName() const;
00059
00061     void setPortName(const Modbus::Char *portName);
00062
00064     int32_t baudRate() const;
00065
00067     void setBaudRate(int32_t baudRate);
00068
00070     int8_t dataBits() const;
00071
00073     void setDataBits(int8_t dataBits);
```

```
00074
00076     Modbus::Parity parity() const;
00077
00079     void setParity(Modbus::Parity parity);
00080
00082     Modbus::StopBits stopBits() const;
00083
00085     void setStopBits(Modbus::StopBits stopBits);
00086
00088     Modbus::FlowControl flowControl() const;
00089
00091     void setFlowControl(Modbus::FlowControl flowControl);
00092
00094     uint32_t timeoutFirstByte() const;
00095
00097     void setTimeoutFirstByte(uint32_t timeout);
00098
00100     uint32_t timeoutInterByte() const;
00101
00103     void setTimeoutInterByte(uint32_t timeout);
00104
00105 public:
00106     const uint8_t *readBufferData() const override;
00107     uint16_t readBufferSize() const override;
00108     const uint8_t *writeBufferData() const override;
00109     uint16_t writeBufferSize() const override;
00110
00111 protected:
00112     Modbus::StatusCode write() override;
00113     Modbus::StatusCode read() override;
00114
00115 protected:
00117     using ModbusPort::ModbusPort;
00119 };
00120
00121 #endif // MODBUSSERIALPORT_H
```

8.26 ModbusServerPort.h

```
00001
00008 #ifndef MODBUSSERVERPORT_H
00009 #define MODBUSSERVERPORT_H
00010
00011 #include "ModbusObject.h"
00012
00021 class MODBUS_EXPORT ModbusServerPort : public ModbusObject
00022 {
00023 public:
00026     ModbusInterface *device() const;
00027
00028 public: // server port interface
00030     virtual Modbus::ProtocolType type() const = 0;
00031
00033     virtual bool isTcpServer() const;
00034
00037     virtual Modbus::StatusCode open() = 0;
00038
00040     virtual Modbus::StatusCode close() = 0;
00041
00043     virtual bool isOpen() const = 0;
00044
00047     virtual Modbus::StatusCode process() = 0;
00048
00049 public:
00051     bool isStateClosed() const;
00052
00053 public: // SIGNALS
00055     void signalOpened(const Modbus::Char *source);
00056
00058     void signalClosed(const Modbus::Char *source);
00059
00062     void signalTx(const Modbus::Char *source, const uint8_t* buff, uint16_t size);
00063
00066     void signalRx(const Modbus::Char *source, const uint8_t* buff, uint16_t size);
00067
00069     void signalError(const Modbus::Char *source, Modbus::StatusCode status, const Modbus::Char *text);
00070
00071 protected:
00072     using ModbusObject::ModbusObject;
00073 };
00074
00075 #endif // MODBUSSERVERPORT_H
00076
```

8.27 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusServerResource.h File Reference

The header file defines the class that controls specific port.

```
#include "ModbusServerPort.h"
```

Classes

- class ModbusServerResource

  Implements direct control for `ModbusPort` derived classes (TCP or serial) for server side.

8.27.1 Detailed Description

The header file defines the class that controls specific port.

Author

march

Date

May 2024

8.28 ModbusServerResource.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSSERVERRESOURCE_H
00009 #define MODBUSSERVERRESOURCE_H
00010
00011 #include "ModbusServerPort.h"
00012
00013 class ModbusPort;
00014
00024 class MODBUS_EXPORT ModbusServerResource : public ModbusServerPort
00025 {
00026 public:
00030     ModbusServerResource(ModbusPort *port, ModbusInterface *device);
00031
00032 public:
00034     ModbusPort *port() const;
00035
00036 public: // server port interface
00038     Modbus::ProtocolType type() const override;
00039
00040     Modbus::StatusCode open() override;
00041
00042     Modbus::StatusCode close() override;
00043
00044     bool isOpen() const override;
00045
00046     Modbus::StatusCode process() override;
00047
00048 protected:
00050     virtual Modbus::StatusCode processInputData(const uint8_t *buff, uint16_t sz);
00051
00053     virtual Modbus::StatusCode processDevice();
00054
00055
00057     virtual Modbus::StatusCode processOutputData(uint8_t *buff, uint16_t &sz);
00058
00059 protected:
00060     using ModbusServerPort::ModbusServerPort;
00061 };
00062
00063 #endif // MODBUSSERVERRESOURCE_H
```

8.29 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusTcpPort.h File Reference

Header file of class `ModbusTcpPort`.

```
#include "ModbusPort.h"
```

Classes

- class ModbusTcpPort

  Class `ModbusTcpPort` implements TCP version of Modbus protocol.
- struct ModbusTcpPort::Defaults

  `Defaults` class constain default settings values for `ModbusTcpPort`.

8.29.1 Detailed Description

Header file of class `ModbusTcpPort`.

Author

march

Date

April 2024

8.30 ModbusTcpPort.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSTCPPORT_H
00009 #define MODBUSTCPPORT_H
00010
00011 #include "ModbusPort.h"
00012
00013 class ModbusTcpSocket;
00014
00021 class MODBUS_EXPORT ModbusTcpPort : public ModbusPort
00022 {
00023 public:
00026     struct MODBUS_EXPORT Defaults
00027     {
00028         const Modbus::Char *host   ;
00029         const uint16_t      port   ;
00030         const uint32_t      timeout;
00031
00033         Defaults();
00034
00036         static const Defaults &instance();
00037     };
00038
00039 public:
00041     ModbusTcpPort(ModbusTcpSocket *socket, bool blocking = false);
00042
00044     ModbusTcpPort(bool blocking = false);
00045
00046 public:
00048     Modbus::ProtocolType type() const override { return Modbus::TCP; }
00049
```

```
00051     Modbus::Handle handle() const override;
00052
00053     Modbus::StatusCode open() override;
00054     Modbus::StatusCode close() override;
00055     bool isOpen() const override;
00056
00057 public:
00059     const Modbus::Char *host() const;
00060
00062     void setHost(const Modbus::Char *host);
00063
00065     uint16_t port() const;
00066
00068     void setPort(uint16_t port);
00069
00071     uint32_t timeout() const;
00072
00074     void setTimeout(uint32_t timeout);
00075
00076     void setNextRequestRepeated(bool v) override;
00077
00079     bool autoIncrement() const;
00080
00081 public:
00082     const uint8_t *readBufferData() const override;
00083     uint16_t readBufferSize() const override;
00084     const uint8_t *writeBufferData() const override;
00085     uint16_t writeBufferSize() const override;
00086
00087 protected:
00088     Modbus::StatusCode write() override;
00089     Modbus::StatusCode read() override;
00090     Modbus::StatusCode writeBuffer(uint8_t unit, uint8_t func, uint8_t *buff, uint16_t szInBuff)
    override;
00091     Modbus::StatusCode readBuffer(uint8_t &unit, uint8_t &func, uint8_t *buff, uint16_t maxSzBuff,
    uint16_t *szOutBuff) override;
00092
00093 protected:
00094     using ModbusPort::ModbusPort;
00095 };
00096
00097 #endif // MODBUSTCPPORT_H
```

8.31 c:/Users/march/Dropbox/PRJ/ModbusLib/src/ModbusTcpServer.h File Reference

Header file of Modbus TCP server.

```
#include "ModbusServerPort.h"
```

Classes

- class ModbusTcpServer

  The `ModbusTcpServer` class implements TCP server part of the Modbus protocol.
- struct ModbusTcpServer::Defaults

  `Defaults` class constain default settings values for `ModbusTcpServer`.

8.31.1 Detailed Description

Header file of Modbus TCP server.

Author

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Date

May 2024

8.32 ModbusTcpServer.h

Go to the documentation of this file.

```
00001
00008 #ifndef MODBUSSERVERTCP_H
00009 #define MODBUSSERVERTCP_H
00010
00011 #include "ModbusServerPort.h"
00012
00013 class ModbusTcpSocket;
00014
00021 class MODBUS_EXPORT ModbusTcpServer : public ModbusServerPort
00022 {
00023 public:
00026     struct MODBUS_EXPORT Defaults
00027     {
00028         const uint16_t port   ;
00029         const uint32_t timeout;
00030
00032         Defaults();
00033
00035         static const Defaults &instance();
00036     };
00037
00038 public:
00040     ModbusTcpServer(ModbusInterface *device);
00041
00042 public:
00044     uint16_t port() const;
00045
00047     void setPort(uint16_t port);
00048
00050     int timeout() const;
00051
00053     void setTimeout(int timeout);
00054
00055 public:
00057     Modbus::ProtocolType type() const override { return Modbus::TCP; }
00058
00060     bool isTcpServer() const override { return true; }
00061
00068     Modbus::StatusCode open() override;
00069
00073     Modbus::StatusCode close() override;
00074
00076     bool isOpen() const override;
00077
00079     Modbus::StatusCode process() override;
00080
00081 public:
00083     virtual ModbusServerPort *createTcpPort(ModbusTcpSocket *socket);
00084
00085 public: // SIGNALS
00087     void signalNewConnection(const Modbus::Char *source);
00088
00090     void signalCloseConnection(const Modbus::Char *source);
00091
00092 protected:
00094     ModbusTcpSocket *nextPendingConnection();
00095
00097     void clearConnections();
00098
00099 protected:
00100     using ModbusServerPort::ModbusServerPort;
00101 };
00102
00103 #endif // MODBUSSERVERTCP_H
```

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