RF62X-SDK Documentation

Выпуск 1.3.3

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Руководство программиста


RF62X SDK
A software development kit for
work with scanners series RF62X

ГЛАВА 1

Введение

RF627X-SDK - набор средств разработки, который позволяет специалистам создавать собственное программное обеспечение для работы с лазерными сканерами серии RF62X (RF627Old, RF627Smart) производства компании РИФТЭК.

1.1 Обзор

Данное руководство создано в помощь разработчикам и содержит детальное описание библиотеки RF62X-SDK.

1.1.1 Общее описание

RF62X-SDK - набор средств разработки, который позволяет быстро создавать собственное программное обеспечение для работы с лазерными сканерами серии RF62X (RF627Old, RF627Smart) производства компании РИФТЭК.

1.1.2 Архитектура библиотеки

RF62X-SDK состоит из двух частей:

- **RF62X-CORE** - основная библиотека («Ядро») с базовым набором функций и типов для работы с лазерными сканерами серии RF62X. Библиотека написана на языке программирования СИ в соответствии со стандартом C99 (ISO / IEC 9899: 1999) и является кросс-платформенной. Для использования данной библиотеки необходима реализация платформозависимых функций (работа с памятью, работа с сетью, функции ввода/вывода).
- **RF62X-WRAPPERS** - библиотеки-«обёртки», в которых уже реализованы платформозависимые функции «Ядра» для конкретной платформы. Использование библиотек-«обёрток» упрощает процесс разработки приложений на следующих языках программирования : C++, C#, PYTHON, LabVew, MatLab.

1.1.3 Способы работы

Разработчики, которые хотят использовать **готовые библиотеки RF62X-SDK** при создании собственных приложений для работы с лазерными сканерами серии RF62X, могут **скачать** последнии версии библиотек (скачать библиотеки RF62X-SDK для *C++*, *C#*), а также посмотреть **примеры их использования** (см. примеры для <how_to_use_rf62x_sdk_cpp>, <how_to_use_rf62x_sdk_csharp>).

Разработчики, которые предпочитают **собирать библиотеки RF62X-SDK** из исходников, в руководстве имеются инструкции по скачиванию исходников (см. *Загрузка проекта*) и установке необходимого программного обеспечения (см. *Установка программного обеспечения*).

1.1.4 Основной функционал

- Поиск сканеров серии RF62X-old.
- Поиск сканеров серии RF62X-smart.
- Получение профилей.
- Получение/установка параметров сканера.
- Поддерживаемые протоколы информационного обмена со сканерами:
  - RF627-Protocol
  - RF62X-SmartProtocol
  - Ethernet/IP
  - ModbusTCP

1.1.5 Что нового

- Добавлена возможность одновременной работы с несколькими сканерами в сети.

1.2 Подготовка к работе

RF62X-SDK предоставляет пользователю простой интерфейс при разработке программного обеспечения для сканеров серии RF62X.

Разработчики, которые хотят использовать **готовые библиотеки RF62X-SDK** при создании собственных приложений для работы с лазерными сканерами серии RF62X, могут **скачать** последнии версии библиотек (скачать библиотеки RF62X-SDK для *C++*, *C#*), а также посмотреть **примеры их использования** (см. примеры для <how_to_use_rf62x_sdk_cpp>, <how_to_use_rf62x_sdk_csharp>).

Разработчики, которые предпочитают **собирать библиотеки RF62X-SDK** из исходников, в руководстве имеются инструкции по скачиванию исходников (см. *Загрузка проекта*) и установке необходимого программного обеспечения (см. *Установка программного обеспечения*).

1.2.1 Целевые платформы и совместимость

Языки программирования

Основная программная библиотека RF62X-CORE (ядро) написана на языке СИ стандарта C99 (ISO / IEC 9899: 1999) без использования сторонних программных модулей и зависимых от операционной системы или процессора функций.

Целевые платформы

Достигнута совместимость с любыми операционными системами семейства Windows, Linux и FreeBSD, поддерживающими компиляторы языка СИ стандарта C99 (ISO / IEC 9899: 1999). Библиотека компилируется из исходных кодов и может быть использована с любыми типами процессоров (x86, ARM, RISC-V и др.).

Поддерживаемые компиляторы

- GCC 5.x или новее в Linux
- XCode 8.0 или новее в OS X
- Visual Studio 2017 или новее в Windows

Ссылки

Этот проект использует git для управления исходным кодом и GitLab для размещения исходного кода.

- Исходники кода: www.gitlab.com/riftek_llc/software/sdk/scanners/RF62X-SDK
- Документация: www.riftek.com
- Веб-сайт: www.riftek.com

1.2.2 Установка и настройка

Установка программного обеспечения

Есть несколько вариантов построения библиотеки RF62X-SDK. Все варианты поддерживаются и должны работать одинаково корректно для:

- IDE Visual Studio 2019
- IDE Qt Creator
- CMake

Примечание: Если вы знакомы с CMake, то вы также можете самостоятельно создавать проекты для CodeBlocks, Eclipse, KDevelop3 и Xcode.

Если возникли сложности с установкой или настройкой сред разработки, ниже приведены более подробные инструкции:

- IDE Visual Studio 2019 (дополнительная информация доступна на оффициальном сайте docs.microsoft.com)
- IDE Qt Creator (дополнительная информация доступна на оффициальном сайте qt.io)
- CMake (дополнительная информация доступна на оффициальном сайте cmake.org)

1.2.3 Загрузка проекта

Git-клиент

Для разработчиков, которые хотят загрузить библиотеку из исходников с помощью Git-клиента, следует выполнить следующие инструкции:

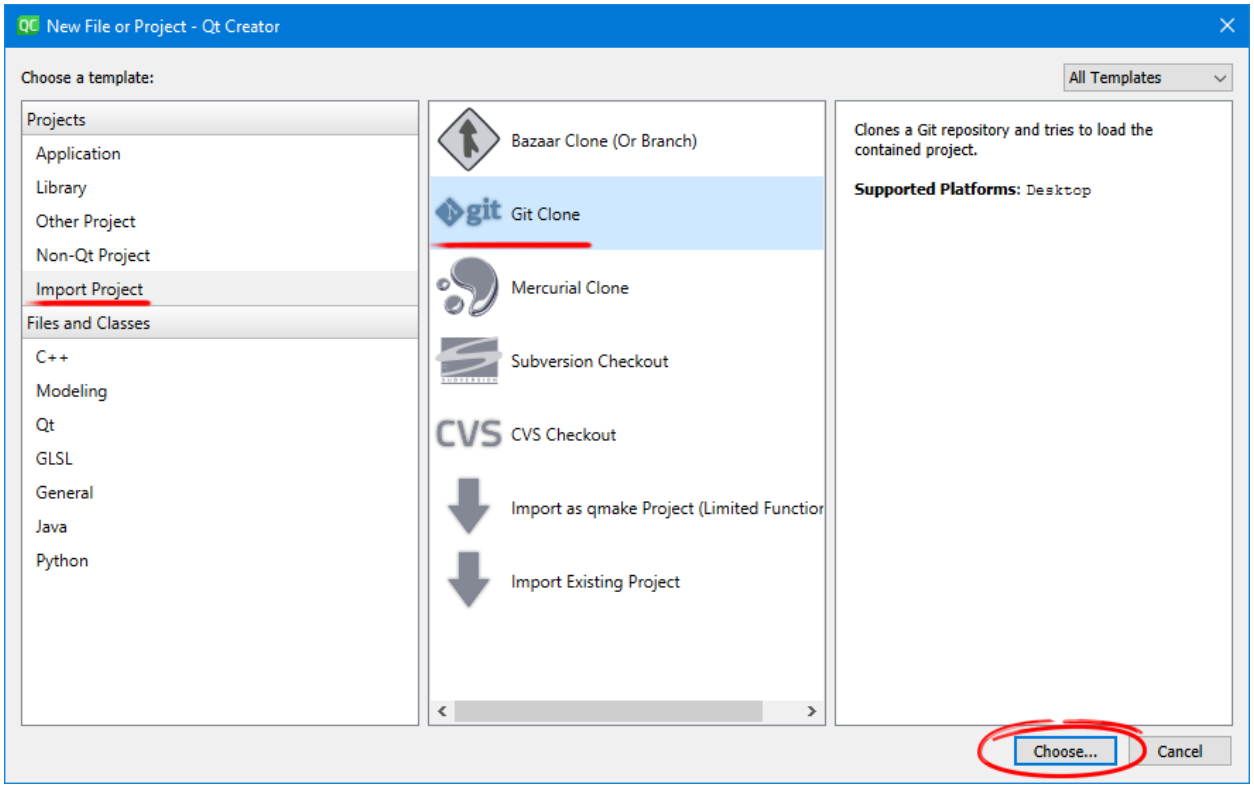
- **Установите git-клиент на свой локальный компьютер (если ещё не установлен)**
  - В Linux используйте команду терминала: `sudo apt install git`
  - На MacOS используйте команду терминала: `brew install git`
  - Для других платформ смотрите документация по установке git.
- **Откройте командную строку/терминал на вашем компьютере**
  - В Linux щелкните панель запуска и найдите «терминал» - *terminal*
  - В OS X нажмите command-space и найдите «терминал» - *terminal*
  - В Windows нажмите меню «Пуск» и найдите «командную строку» - *cmd*.
- **Клонируйте репозиторий с помощью следующих команд:**

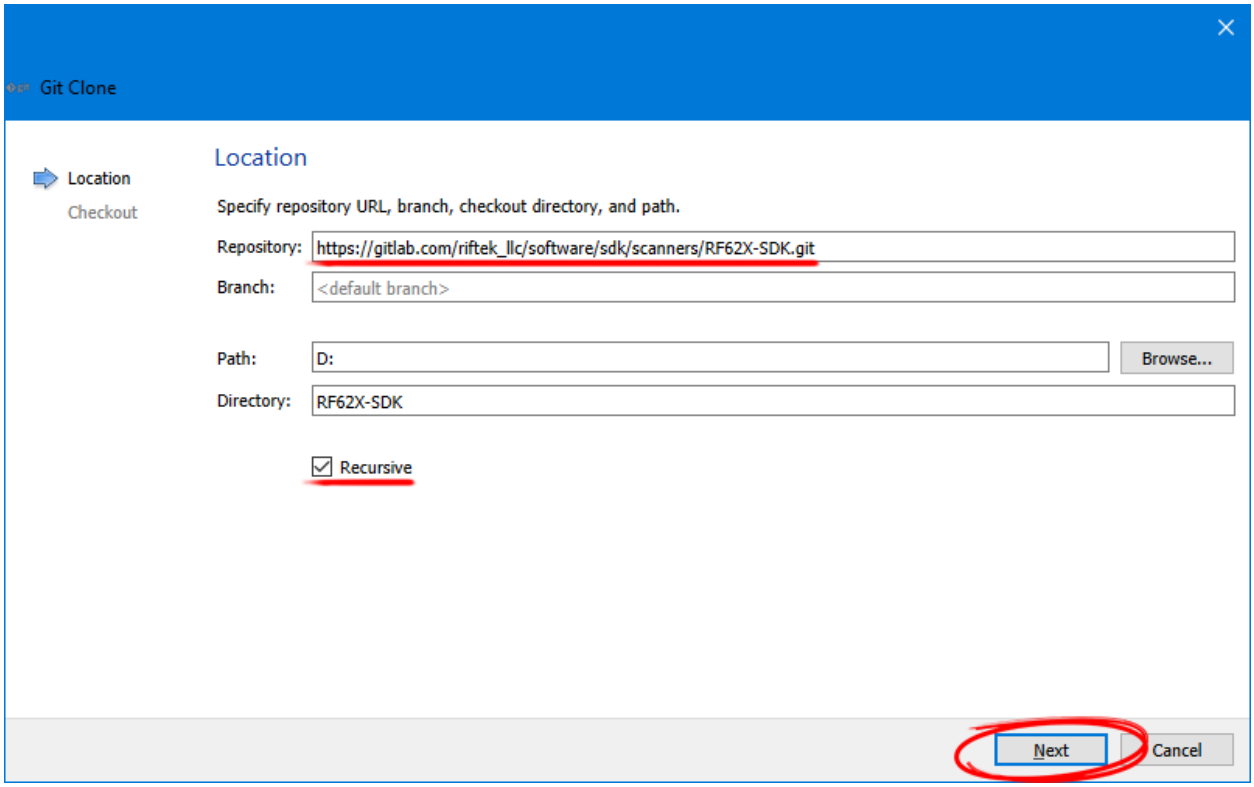
```
git clone https://gitlab.com/riftek_llc/software/sdk/scanners/RF62X-SDK.
↪git
cd RF62X-SDK
git submodule update --init --recursive
```

Git в Qt Creator

Для разработчиков, которые хотят загрузить и собрать библиотеку из исходников с помощью Git, встроенного в IDE Qt Creator, следует выполнить следующие инструкции:

1. Нажмите **File->New File or Project**
2. Выберите опцию **Import Project->Git Clone**, как показано ниже.
3. Введите url-адрес SDK `https://gitlab.com/riftek_llc/software/sdk/scanners/RF62X-SDK.git`, выберите опцию **«Recursive»**, а затем нажмите **Next**.
4. После загрузки откройте файл CMakeLists.txt необходимого вам проекта через **File > Open File or Project**, выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
5. Запустите сборку проекта

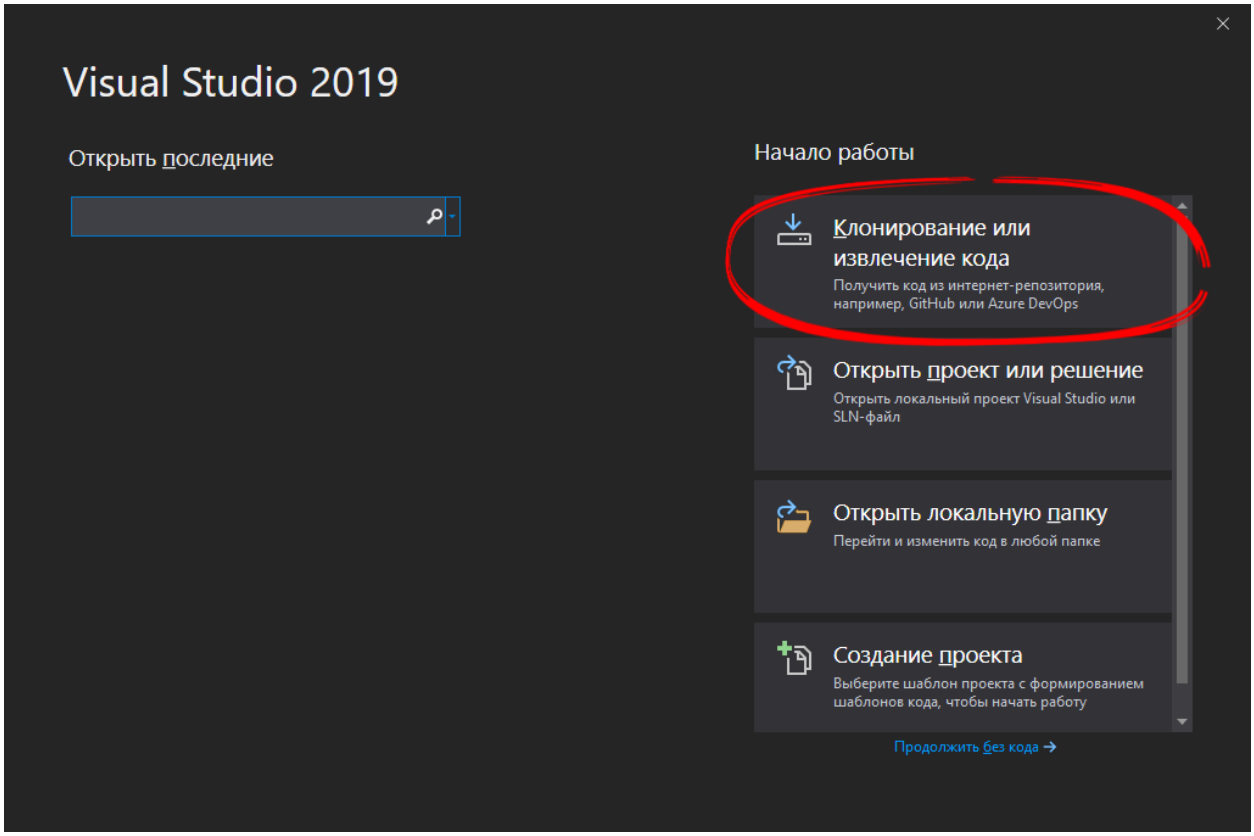

New File or Project - Qt Creator
Choose a template:
All Templates
Projects
Application
Library
Other Project
Non-Qt Project
Import Project
Files and Classes
C++
Modeling
Qt
GLSL
General
Java
Python
Bazaar Clone (Or Branch)
Git Clone
Mercurial Clone
Subversion Checkout
CVS Checkout
Import as qmake Project (Limited Functior
Import Existing Project
Clones a Git repository and tries to load the contained project.
Supported Platforms: Desktop
Choose...
Cancel


Git Clone
Location
Checkout
Location
Specify repository URL, branch, checkout directory, and path.
Repository: https://gitlab.com/riftek_llc/software/sdk/scanners/RF62X-SDK.git
Branch: <default branch>
Path: D:
Browse...
Directory: RF62X-SDK
Recursive
Next
Cancel

Git в Visual Studio

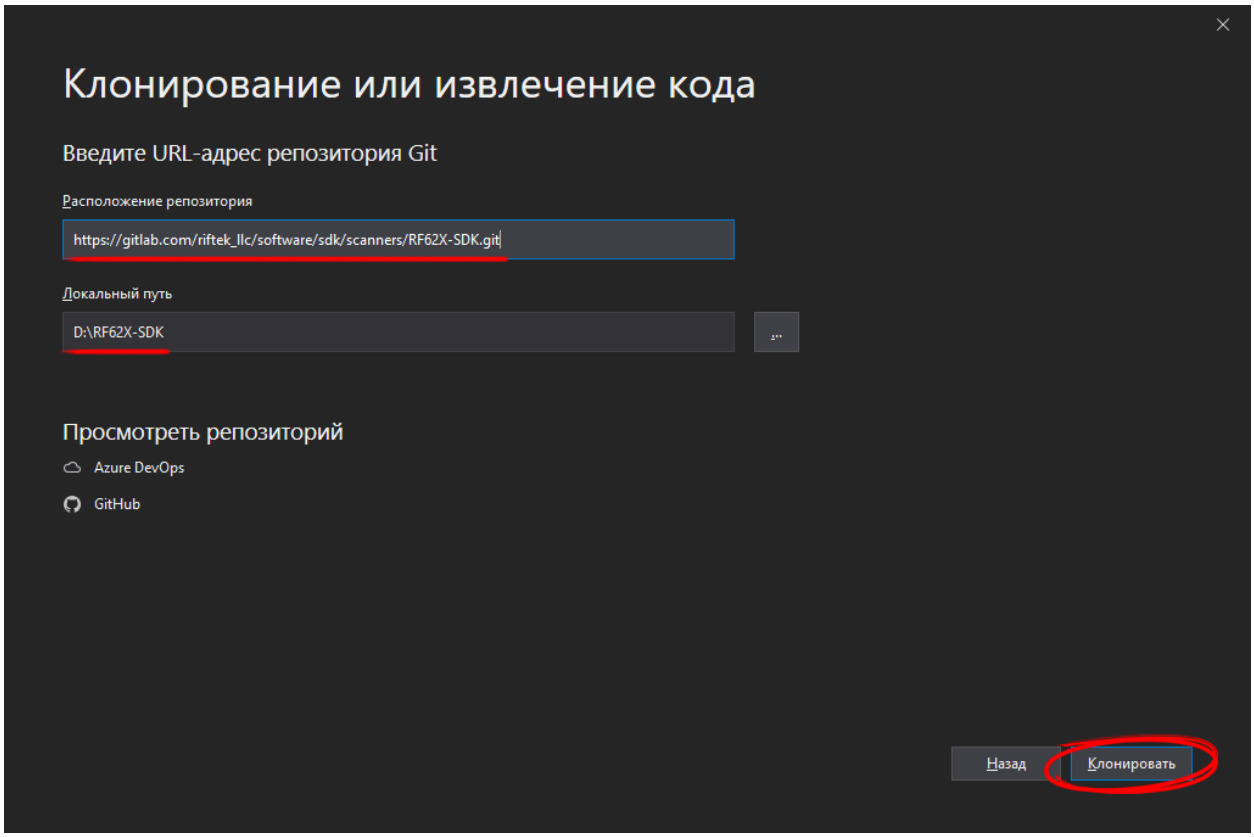
Для разработчиков, которые хотят загрузить и собрать библиотеку из исходников с помощью Git, встроенного в IDE Visual Studio, следует выполнить следующие инструкции:

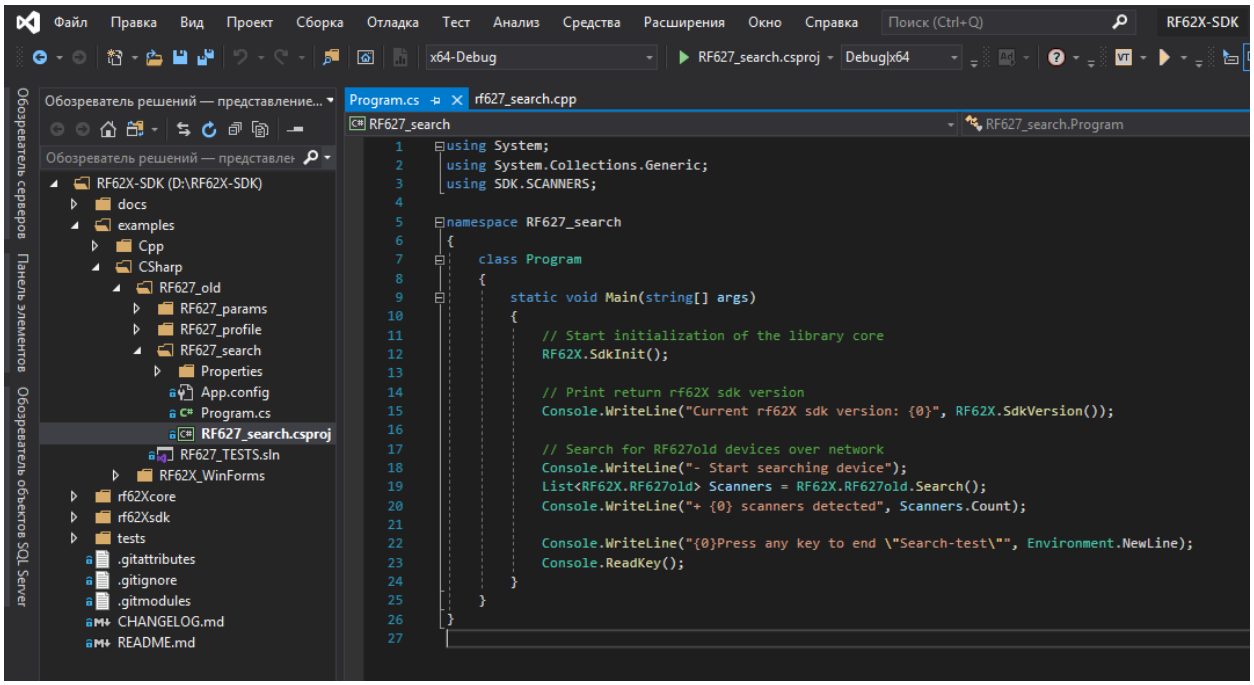
1. Откройте Visual Studio 2019.
2. В стартовом окне выберите **Клонирование или извлечение кода**.



3. Введите url-адрес SDK `https://gitlab.com/riftek_llc/software/sdk/scanners/RF62X-SDK.git`, выберите или введите местоположение хранилища, а затем нажмите **Клонировать**.
4. После чего Visual Studio загрузит проект из удаленного репозитория и откроет его.
5. Выберите один из необходимых вам проектов и запустите его сборку.

Примечание: Для сборки библиотек **на языке C++**, а также компиляции приложений с примерами их использования в Visual Studio должен быть установлен C++ CMake tools для Windows.


Клонирование или извлечение кода
Введите URL-адрес репозитория Git
Расположение репозитория
https://gitlab.com/riftek_llc/software/sdk/scanners/RF62X-SDK.git
Локальный путь
D:\RF62X-SDK
Просмотреть репозиторий
Azure DevOps
GitHub
Назад
Клонировать


Файл Правка Вид Проект Сборка Отладка Тест Анализ Средства Расширения Окно Справка
Поиск (Ctrl+Q)
RF62X-SDK
x64-Debug
RF627_search.csproj
Debug|x64
Обозреватель решений — представление...
Program.cs
rf627_search.cpp
RF627_search
RF627_search.Program
RF62X-SDK (D:\RF62X-SDK)
docs
examples
Cpp
CSharp
RF627_old
RF627_params
RF627_profile
RF627_search
Properties
App.config
Program.cs
RF627_search.csproj
RF627_TESTS.sln
RF62X_WinForms
rf62Xcore
rf62Xsdk
tests
.gitattributes
.gitignore
.gitmodules
CHANGELOG.md
README.md
using System;
using System.Collections.Generic;
using SDK.SCANNERS;
namespace RF627_search
{
class Program
{
static void Main(string[] args)
{
// Start initialization of the library core
RF62X.SdkInit();
// Print return rf62X sdk version
Console.WriteLine("Current rf62X sdk version: {0}", RF62X.SdkVersion());
// Search for RF627old devices over network
Console.WriteLine("- Start searching device");
List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();
Console.WriteLine("+ {0} scanners detected", Scanners.Count);
Console.WriteLine("{0}Press any key to end \"Search-test\"", Environment.NewLine);
Console.ReadKey();
}
}
}

1.3 Компиляция из исходников

Как упоминалось ранее, RF62X-SDK состоит из двух частей:

- **RF62X-CORE** - основная библиотека («Ядро») с базовым набором функций и типов для работы с лазерными сканерами серии RF62X. Библиотека написана на языке программирования СИ в соответствии со стандартом C99 (ISO / IEC 9899: 1999) и является кросс-платформенной. Для использования данной библиотеки необходима реализация платформозависимых функций (работа с памятью, работа с сетью, функции ввода/вывода).
- **RF62X-WRAPPERS** - библиотеки-«обёртки», в которых уже реализованы платформозависимые функции «Ядра» для конкретной платформы. Использование библиотек-«обёрток» упрощает процесс разработки приложений на следующих языках программирования : C++, C#, PYTHON, LabVew, MatLab.

1.3.1 Компиляция «ядра» на C

RF62X-CORE - основная библиотека («Ядро») с базовым набором функций и типов для работы с лазерными сканерами серии RF62X. Библиотека написана на языке программирования СИ в соответствии со стандартом C99 (ISO / IEC 9899: 1999) и является кросс-платформенной. Для использования данной библиотеки необходима реализация платформозависимых функций (работа с памятью, работа с сетью, функции ввода/вывода).

Таблица 1: Последние выпуски:

Compiler	64bit	Includes
MinGW 7.3.0	rf62Xcore.dll rf62Xcore.a	include.zip
MSVC2017	rf62Xcore.dll rf62Xcore.lib	include.zip
Clang 9.1.0	rf62Xcore.dll rf62Xcore.lib	include.zip

Как скомпилировать

RF62X-CORE может быть скомпилирован при помощи консоли или среды разработки (Visual Studio, Qt Creator)

Во-первых, вы должны загрузить проект (если не сделали этого ранее)

Примечание: для получения дополнительной информации о шагах загрузки проекта см. *Загрузка проекта*

CMake

Находясь в папке с проектом, для построения RF62X-CORE введите следующую команду в консоль (терминал):

```
cd rf62Xcore
mkdir build
cd build
cmake ..
cmake --build .
```

Qt Creator

Для построения RF62X-CORE с использованием IDE Qt Creator:

- Загрузите файл CMakeLists.txt из папки **rf62Xcore** через **File > Open File or Project** (выберите файл CMakeLists.txt)
- Выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
- Откройте **Build Settings** и отметьте пункт **install** для **Build Steps**
- Скомпилируйте проект

Visual Studio

Находясь в папке с проектом, для построения RF62X-CORE введите следующую команду в консоль (терминал):

```
cd rf62Xcore
mkdir build
cd build
cmake ..
```

- Откройте полученное решение rf62Xcore.sln в Visual Studio
- Скомпилируйте проект

Как использовать

При желании использовать библиотеку RF62X-CORE вместо предоставляемых библиотек-«обёрток» разработчику необходимо самостоятельно реализовать платформозависимую часть «ядра».

Обзор платформозависимых функций

В «Ядре» RF62X-CORE платформозависимые функции (работа с памятью, работа с сетью, функции ввода/вывода) представлены в виде указателей на функции.

Указатели на платформозависимые функции объявлены в файлах, `memory_platform.h`, `network_platform.h` и `iostream_platform.h`:

memory_platform.h

typedef void *(***calloc_t**)(rfSize num, rfSize size)
Allocates an array in memory with elements initialized to 0.

Return

- On success: returns a pointer to the allocated space.
- On error: NULL

Parameters

- `num`: - number of elements to allocate.
- `size`: - size of each element.

typedef void *(***malloc_t**)(rfSize size)
malloc_t - ptr to function whish allocates memory block Allocates a block of size bytes of memory, returning a pointer to the beginning of the block.

Return On success, a pointer to the memory block allocated by the function. If the function failed to allocate the requested block of memory, a null pointer is returned.

Parameters

- `size`: - Size of the memory block, in bytes.

typedef void *(***realloc_t**)(void *ptr, rfSize newsize)
realloc_t - ptr to function whish reallocates memory block Changes the size of the memory block pointed to by ptr. The function may move the memory block to a new location (whose address is returned by the function).

Return A pointer to the reallocated memory block, which may be either the same as ptr or a new location.

Parameters

- `ptr`: - Pointer to a memory block previously allocated.
- `newsize`: - New size for the memory block, in bytes.

typedef void (***free_t**)(void *data)
Deallocates or frees a memory block.

Parameters

- `data`: - Previously allocated memory block to be freed.

typedef void *(***memset_t**)(void *memptr, rfInt val, rfSize num)

memset_t - ptr to function whish fills block of memory Sets the first num bytes of the block of memory pointed by ptr to the specified value (interpreted as an unsigned rfChar).

Return ptr is returned.

Parameters

- `memptr`: - Pointer to the block of memory to fill.
- `val`: - Value to be set.
- `num`: - Number of bytes to be set to the value. rfSize is an unsigned rfIntegral type.

typedef void *(***memcpy_t**)(void *destination, **const** void *source, rfSize num)

memcpy_t - ptr to function whish copies block of memory Copies the values of num bytes from the location pointed to by source directly to the memory block pointed to by destination.

Return destination is returned.

Parameters

- `destination`: - Pointer to the destination array where the content is to be copied, type-casted to a pointer of type void*.
- `source`: - Pointer to the source of data to be copied, type-casted to a pointer of type const void*.
- `num`: - Number of bytes to copy. rfSize is an unsigned rfIntegral type.

typedef rfInt (***memcmp_t**)(**const** void *ptr1, **const** void *ptr2, rfSize num)

memcmp_t - ptr to function whish compare two blocks of memory Compares the first num bytes of the block of memory pointed by ptr1 to the first num bytes pointed by ptr2, returning zero if they all match or a value different from zero representing which is greater if they do not.

Return 0 - if the contents of both memory blocks are equal, <0 - if the first byte that does not match in both memory blocks has a lower value in ptr1 than in ptr2. >0 - if the first byte that does not match in both memory blocks has a greater value in ptr1 than in ptr2.

Parameters

- `ptr1`: - Pointer to block of memory.
- `ptr2`: - Pointer to block of memory.
- `num`: - Number of bytes to compare.

network_platform.h

typedef rfUint32 (***hton_long_t**)(rfUint32 hostlong)

The modbusHtoN_long_t function converts a u_long from host to TCP/IP network byte order (which is big-endian).

Return : The modbusHtoN_long_t function returns the value in TCP/IP's network byte order.

Parameters

- `hostlong`: - A 32-bit number in host byte order.

typedef rfUint32 (***ntoh_long_t**)(rfUint32 netlong)

The modbusHtoN_long_t function converts a u_long from TCP/IP network order to host byte order (which is little-endian on rfIntel processors).

Return : The modbusNtoH_long_t function returns the value supplied in the netlong parameter with the byte order reversed.

Parameters

- `netlong`: - A 32-bit number in TCP/IP network byte order.

typedef rfUint16 (***hton_short_t**)(rfUint16 hostshort)

The modbusHtoN_short_t function converts a u_short from host to TCP/IP network byte order (which is big-endian).

Return : The modbusHtoN_short_t function returns the value in TCP/IP's network byte order.

Parameters

- `hostlong`: - A 16-bit number in host byte order.

typedef rfUint16 (***ntoh_short_t**)(rfUint16 netshort)

The modbusHtoN_short_t function converts a u_short from TCP/IP network byte order to host byte order.

Return : The modbusNtoH_short_t function returns the value in host byte order.

Parameters

- `netshort`: - A 16-bit number in TCP/IP network byte order.

typedef void *(***create_udp_socket_t**)()

Pointer to TCP socket creation function.

Return

- On success: If no error occurs, modbusCreateTcpSocket_t returns a descriptor referencing the new socket
- On error: NULL

Parameters

- `af`: - The address family specification.
- `type`: - The type specification for the new socket.
- `protocol`: - The protocol to be used.

typedef rfInt8 (***set_broadcast_socket_option_t**)(void *socket)

Pointer to the function that sets a socket option.

Return

- On success: If no error occurs, modbusSetSocketOption_t returns zero
- On error: -1

Parameters

- `socket`: - A descriptor that identifies a socket.
- `level`: - The level at which the option is defined.
- `optname`: - The socket option for which the value is to be set.
- `optval`: - A pointer to the buffer in which the value for the requested option is specified.
- `optlen`: - The size, in bytes, of the buffer pointed to by the optval parameter.

typedef rfInt8 (***set_reuseaddr_socket_option_t**)(void *socket)

Pointer to the function that sets a socket option.

Return

- On success: If no error occurs, modbusSetSocketOption_t returns zero
- On error: -1

Parameters

- `socket`: - A descriptor that identifies a socket.
- `level`: - The level at which the option is defined.
- `optname`: - The socket option for which the value is to be set.
- `optval`: - A pointer to the buffer in which the value for the requested option is specified.
- `optlen`: - The size, in bytes, of the buffer pointed to by the optval parameter.

typedef rfInt8 (***set_socket_option_t**)(void *socket, rfInt32 level, rfInt32 optname, **const** rfChar *optval, rfInt32 optlen)

Pointer to the function that sets a socket option.

Return

- On success: If no error occurs, modbusSetSocketOption_t returns zero
- On error: -1

Parameters

- `socket`: - A descriptor that identifies a socket.
- `level`: - The level at which the option is defined.
- `optname`: - The socket option for which the value is to be set.
- `optval`: - A pointer to the buffer in which the value for the requested option is specified.
- `optlen`: - The size, in bytes, of the buffer pointed to by the optval parameter.

typedef rfInt8 (***set_socket_recv_timeout_t**)(void *socket, rfInt32 msec)

Pointer to the function that sets a timeout for socket receive.

Return

- On success: If no error occurs, returns zero

- On error: -1

Parameters

- `socket`: - A descriptor that identifies a socket.
- `msec`: - The timeout in millisec.

typedef rfUint8 (***socket_connect_t**)(void *socket, rfUint32 dst_ip_addr, rfUint16 dst_port)

Pointer to the function that establishes a connection to a specified socket.

Return

- On success: If no error occurs, modbusSocketConnect_t returns zero
- On error: -1

Parameters

- `socket`: - A descriptor identifying an unconnected socket.
- `name`: - A pointer to the SockAddr structure to which the connection should be established.
- `namelen`: - The length, in bytes, of the SockAddr structure pointed to by the name parameter.

typedef rfInt (***socket_bind_t**)(void *socket, rfUint32 ip_addr, rfUint16 port)

Pointer to the function that associates a local address with a socket.

Return

- On success: If no error occurs, modbusSocketBind_t returns zero
- On error: -1

Parameters

- `socket`: - A descriptor identifying an unconnected socket.
- `name`: - A pointer to the SockAddr structure to which the connection should be established.
- `namelen`: - The length, in bytes, of the SockAddr structure pointed to by the name parameter.

typedef rfUint8 (***socket_listen_t**)(void *socket, rfInt32 backlog)

Pointer to the function that places a socket in a state in which it is listening for an incoming connection.

Return

- On success: If no error occurs, modbusSocketListen_t returns zero
- On error: -1

Parameters

- `socket`: - A descriptor identifying a bound, unconnected socket.
- `backlog`: - The maximum length of the queue of pending connections.

typedef void *(***socket_accept_t**)(void *socket, rfUint32 *srs_ip_addr, rfUint16 *srs_port)

Pointer to the function that permits an incoming connection attempt on a socket.

Return

- On success: If no error occurs, modbusSocketAccept_t returns value is a handle for the socket on which the actual connection is made
- On error : NULL

Parameters

- `socket`: - A descriptor that identifies a socket that has been placed in a listening state with the modbusSocketListen_t function. The connection is actually made with the socket that is returned by accept.
- `name`: - An optional pointer to a buffer that receives the address of the connecting entity, as known to the communications layer. The exact format of the addr parameter is determined by the address family that was established when the socket from the SockAddr structure was created.
- `addrlen`: - An optional pointer to an rfInteger that contains the length of structure pointed to by the addr parameter.

typedef rfUint8 (***close_socket_t**)(void *socket)

Pointer to the function that closes an existing socket.

Return

- On success: If no error occurs, modbusCloseTcpSocket_t returns zero.
- On error: -1

Parameters

- `socket`: - A descriptor identifying the socket to close.

typedef rfInt (***send_tcp_data_t**)(void *socket, **const** void *buf, rfSize len)

Pointer to the send function that sends data on a TCP connected socket.

Return

- On success: If no error occurs, send returns the total number of bytes sent, which can be less than the number requested to be sent in the len parameter
- On error: -1

Parameters

- `socket`: - A descriptor identifying a connected socket.
- `buf`: - A pointer to a buffer containing the data to be transmitted.
- `len`: - The length, in bytes, of the data in buffer pointed to by the buf parameter.

typedef rfInt (***send_udp_data_t**)(void *socket, **const** void *data, rfSize len, rfUint32 dest_ip_addr, rfUint16 dest_port)

Pointer to the send function that sends data on a UDP socket.

Return

- On success: If no error occurs, send returns the total number of bytes sent, which can be less than the number requested to be sent in the len parameter
- On error: -1

Parameters

- `socket`: - A descriptor identifying a socket.
- `buf`: - A pointer to a buffer containing the message to be sent.
- `len`: - The size of the message in bytes.
- `dest_addr`: - Points to a sockaddr_in structure containing the destination address.
- `addrlen`: - Specifies the length of the sockaddr_in structure pointed to by the dest_addr argument.

typedef rfInt (***recv_data_from_t**)(void *sockfd, void *buf, rfSize len, rfUint32 *srs_ip_addr, rfUint16 *srs_port)

Pointer to the function that receive message from socket and capture address of sender.

Return If successful - the number of bytes received. On failure, it returns a value of -1

Parameters

- `sockfd`: - Specifies a socket descriptor from which data should be received.
- `buf`: - Specifies the buffer in which to place the message.
- `len`: - Specifies the length of the buffer area.
- `src_addr`: - Specifies a socket address structure to record the address of the message sender.
- `addrlen`: - Specifies the length of the sender's address.

typedef rfInt (***recv_data_t**)(void *socket, void *buf, rfSize len)

Pointer to the function that receive message from socket and capture address of sender.

Return If successful - the number of bytes received. On failure, it returns a value of -1

Parameters

- `sockfd`: - Specifies a socket descriptor from which data should be received.
- `buf`: - Specifies the buffer in which to place the message.
- `len`: - Specifies the length of the buffer area.

iostream_platform.h

typedef rfInt (***trace_info_t**)(**const** rfChar *msg, ...)

Method for outputting debugging information.

typedef rfInt (***trace_warning_t**)(**const** rfChar *msg, ...)

Method for outputting alert information.

typedef rfInt (***trace_error_t**)(**const** rfChar *msg, ...)

Method for outputting error information.

Запуск «ядра»

После реализации всех платформозависимых функций разработчику необходимо проинициализировать следующие структуры `iostream_platform_dependent_methods_t`, `memory_platform_dependent_methods_t` и `network_platform_dependent_methods_t`

struct memory_platform_dependent_methods_t

Public Members

calloc_t **rf_calloc**

malloc_t **rf_malloc**

realloc_t **rf_realloc**

free_t **rf_free**

memset_t **rf_memset**

memcpy_t **rf_memcpy**

memcmp_t **rf_memcmp**

struct network_platform_dependent_methods_t

Public Members

hton_long_t **hton_long**

ntoh_long_t **ntoh_long**

hton_short_t **hton_short**

ntoh_short_t **ntoh_short**

create_udp_socket_t **create_udp_socket**

set_broadcast_socket_option_t **set_broadcast_socket_option**

set_reuseaddr_socket_option_t **set_reuseaddr_socket_option**

set_socket_option_t **set_socket_option**

set_socket_recv_timeout_t **set_socket_recv_timeout**

socket_connect_t **socket_connect**

socket_bind_t **socket_bind**

socket_listen_t **socket_listen**

socket_accept_t **socket_accept**

close_socket_t **close_socket**

send_tcp_data_t **send_tcp_data**

send_udp_data_t **send_udp_data**

recv_data_from_t **recv_data_from**

recv_data_t **recv_data**

struct iostream_platform_dependent_methods_t

Public Members

trace_info_t **trace_info**

trace_warning_t **trace_warning**

trace_error_t **trace_error**

struct network_platform_dependent_settings_t

Public Members

rfUint32 **host_ip_addr**

rfUint32 **host_mask**

Инициализация данных структур производится путем присваивания указателей на реализованные платформозависимые функции, а адреса проинициализированных экземпляров структур передаются в метод init_platform_dependent_methods для инициализации кросс-платформенной части «ядра».

void **init_platform_dependent_methods**(*memory_platform_dependent_methods_t *memory_methods*, *iostream_platform_dependent_methods_t *iostream_methods*, *network_platform_dependent_methods_t *network_methods*, *network_platform_dependent_settings_t *adapter_settings*)

init_platform_dependent_methods - Init platform dependent methods and settings

Parameters

- `memory_methods`: Structure with platform-specific methods for work with memory
- `iostream_methods`: Structure with platform-specific methods for work with iostream
- `network_methods`: Structure with platform-specific methods for work with network
- `adapter_settings`: Structure with platform-specific settings

1.3.2 Компиляция «обёртки» на C++

Эта библиотека позволяет упростить разработку приложений на языке C++

Для её использования в проектах C++ разработчик должен включить необходимые h-файлы библиотеки в свой проект и собрать статическую или динамическую программную библиотеку.

Таблица 2: Последние выпуски:

Compiler	64bit	Includes
MinGW 7.3.0	rf62Xsdk.dll rf62Xsdk.a	include.zip
MSVC2017	rf62Xsdk.dll rf62Xsdk.lib	include.zip
Clang 9.1.0	rf62Xsdk.dll rf62Xsdk.lib	include.zip

Как скомпилировать

Библиотека-«обёртка» rf62Xsdk может быть скомпилирован при помощи консоли или среды разработки (Visual Studio, Qt Creator)

Во-первых, вы должны загрузить проект (если не сделали этого ранее)

Примечание: для получения дополнительной информации о шагах загрузки проекта см. *Загрузка проекта*

CMake

Находясь в папке с проектом, для построения библиотеки-«обёртки» (rf62Xsdk библиотеки) введите следующую команду в консоль (терминал):

```
cd rf62Xwrappers/Cpp/rf62Xsdk
mkdir build
cd build
cmake ..
cmake --build .
```

Qt Creator

Для построения библиотеки-«обёртки» (rf62Xsdk библиотеки) с использованием IDE Qt Creator:

- Загрузите файл CMakeLists.txt из папки **rf62Xwrappers/Cpp/rf62Xsdk** через **File > Open File or Project** (выберите файл CMakeLists.txt)
- Выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
- Откройте **Build Settings** и отметьте пункт **install** для **Build Steps**
- Скомпилируйте проект

Visual Studio

Находясь в папке с проектом, для построения RF62X CORE (rf62Xcore библиотеки) введите следующую команду в консоль (терминал):

```
cd rf62Xwrappers/Cpp/rf62Xsdk
mkdir build
cd build
cmake ..
```

- Откройте полученное решение rf62Xsdk.sln в Visual Studio
- Скомпилируйте проект

Как использовать

Вы можете **создать свой проект**, включив в него статическую или динамическую библиотеку и необходимые заголовочные файлы, или вы можете **открыть и скомпилировать** один из приведенных ниже примеров использования из папки **examples/Cpp/RF627_old/**.

Примечание: Помимо приведенных ниже примеров, где каждый может быть скомпилирован и выполнен, вы также можете прочитать документацию для «обёртки» на C++ (см. rf62x_wrappers_description_cpp), где каждая функция содержит отдельный пример кода.

Поиск устройств RF62X

Ниже приведен пример поиска сканеров серии RF627Old в сети

```
#include <rf62Xsdk.h>
#include <rf62Xtypes.h>
#include <string>
#include <iostream>

using namespace SDK::SCANNERS::RF62X;

int main()
{

   // Initialize sdk library
   sdk_init();

   // Print return rf627 sdk version
   std::cout << "SDK version: " << sdk_version()                 << std::endl;
   std::cout << "========================================="      << std::endl;

   // Create value for scanners vector's type
   std::vector<rf627old*> list;
   // Search for RF627old devices over network
   list = rf627old::search(PROTOCOLS::SERVICE);

   // Print count of discovered RF627Old in network by Service Protocol
   std::cout << "Discovered: " << list.size() << " RF627Old"    << std::endl;
```

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(продолжение с предыдущей страницы)

```
    for (size_t i = 0; i < list.size(); i++)
    {
        rf627old::hello_info info = list[i]->get_info();

        std::cout << "\n\n\nID scanner's list: " << i            << std::endl;
        std::cout << "----------------------------------------" << std::endl;
        std::cout << "Device information: "                     << std::endl;
        std::cout << "* Name\t: "     << info.device_name()      << std::endl;
        std::cout << "* Serial\t: "   << info.serial_number()    << std::endl;
        std::cout << "* IP Addr\t: "  << info.ip_address()       << std::endl;
        std::cout << "* MAC Addr\t: " << info.mac_address()      << std::endl;

        std::cout << "\nWorking ranges: "                        << std::endl;
        std::cout << "* Zsmr, mm\t: " << info.z_smr()            << std::endl;
        std::cout << "* Zmr , mm\t: " << info.z_mr()             << std::endl;
        std::cout << "* Xsmr, mm\t: " << info.x_smr()            << std::endl;
        std::cout << "* Xemr, mm\t: " << info.x_emr()            << std::endl;

        std::cout << "\nVersions: "                              << std::endl;
        std::cout << "* Firmware\t: " << info.firmware_version() << std::endl;
        std::cout << "* Hardware\t: " << info.hardware_version() << std::endl;
        std::cout << "----------------------------------------" << std::endl;
    }

    system("pause");
}
```

Ниже приведён результат вывода приложения при успешном обнаружении сканера в сети:

```
SDK version: 1.3.0
========================================
Discovered: 1 RF627Old

ID scanner's list: 0
----------------------------------------
Device information:
* Name      : RF627
* Serial    : 190068
* IP Addr   : 192.168.1.32
* MAC Addr  : 00:0a:35:6e:07:f5

Working ranges:
* Zsmr, mm  : 70
* Zmr , mm  : 50
* Xsmr, mm  : 30
* Xemr, mm  : 42

Versions:
* Firmware  : 19.11.12
* Hardware  : 18.6.20
----------------------------------------
Press any key to continue . . .
```

Вы можете открыть и скомпилировать этот пример с помощью **Qt Creator**:

- Загрузите файл CMakeLists.txt из папки **examples/Cpp/RF627_old/RF627_search** через **File > Open File or Project** (выберите файл CMakeLists.txt)

- Выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
- Запустите проект

Получение профиля сканера

Ниже приведен пример получения профилей от сканеров серии RF627Old

```
#include <rf62Xsdk.h>
#include <rf62Xtypes.h>
#include <string>
#include <iostream>

using namespace SDK::SCANNERS::RF62X;

int main()
{

    // Initialize sdk library
   sdk_init();

   // Print return rf627 sdk version
   std::cout << "SDK version: " << sdk_version()                 << std::endl;
   std::cout << "========================================="      << std::endl;


    // Create value for scanners vector's type
   std::vector<rf627old*> list;
   // Search for RF627old devices over network
   list = rf627old::search(PROTOCOLS::SERVICE);


   // Print count of discovered RF627Old in network by Service Protocol
   std::cout << "Discovered: " << list.size() << " RF627Old"    << std::endl;


   // Iterate over all discovered RF627Old in network, connect to each of
   // them and get a profile.
   for(size_t i = 0; i < scanners.size(); i++)
   {
      rf627old::hello_info info = list[i]->get_info();

      // Print information about the scanner to which the profile belongs.
      std::cout << "\n\n\nID scanner's list: " << i             << std::endl;
      std::cout << "----------------------------------------" << std::endl;
      std::cout << "Device information: "                      << std::endl;
      std::cout << "* Name\t: "     << info.device_name()      << std::endl;
      std::cout << "* Serial\t: "   << info.serial_number()    << std::endl;
      std::cout << "* IP Addr\t: "  << info.ip_address()       << std::endl;

      // Establish connection to the RF627 device by Service Protocol.
      list[i]->connect();

      // Get profile from scanner's data stream by Service Protocol.
      profile2D_t* profile = list[i]->get_profile2D();
      if (profile != nullptr)
      {
```

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(продолжение с предыдущей страницы)

```
        std::cout << "Profile information: "                    << std::endl;
        switch (profile->header.data_type) {
        case (uint8_t)PROFILE_DATA_TYPE::PIXELS:
            std::cout << "* DataType\t: "<< "PIXELS"            << std::endl;
            std::cout << "* Count\t: " << profile->pixels.size()<< std::endl;
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PROFILE:
            std::cout << "* DataType\t: "<< "PROFILE"           << std::endl;
            std::cout << "* Size\t: "  << profile->points.size()<< std::endl;
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PIXELS_INTRP:
            std::cout << "* DataType\t: "<< "PIXELS_INTRP"      << std::endl;
            std::cout << "* Count\t: " << profile->pixels.size()<< std::endl;
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PROFILE_INTRP:
            std::cout << "* DataType\t: "<< "PROFILE_INTRP"     << std::endl;
            std::cout << "* Size\t: "  << profile->points.size()<< std::endl;
            break;
        }
        std::cout << "Profile was successfully received!"       << std::endl;
        std::cout << "----------------------------------------"<< std::endl;
      }else
      {
        std::cout << "Profile was not received!"                << std::endl;
        std::cout << "----------------------------------------"<< std::endl;
      }

   }

   system("pause");
}
```

Ниже приведён результат вывода приложения при успешном получении профиля от сканера:

```
SDK version: 1.3.0
========================================
Discovered: 1 RF627Old


ID scanner's list: 0
----------------------------------------
Device information:
* Name      : RF627
* Serial    : 190068
* IP Addr   : 192.168.1.32
Profile information:
* DataType  : PROFILE
* Size      : 648
Profile was successfully received!
----------------------------------------
Press any key to continue . . .
```

Вы можете открыть и скомпилировать этот пример с помощью **Qt Creator**:

- Загрузите файл CMakeLists.txt из папки **examples/Cpp/RF627_old/RF627_profile** через **File > Open File or Project** (выберите файл CMakeLists.txt)

- Выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
- Запустите проект

Получение и установка параметров

Ниже приведен пример получения и изменения имени сканера, установки IP адреса, смены состояния лазера (включение или отключение):

```
#include <rf62Xsdk.h>
#include <rf62Xtypes.h>
#include <iostream>
#include <string>

using namespace SDK::SCANNERS::RF62X;

int main()
{

   // Initialize sdk library
   sdk_init();

   // Print return rf62X SDK version
   std::cout << "SDK version: " << sdk_version()                    <<␣
↪std::endl;
   std::cout << "========================================="         <<␣
↪std::endl;


   // Create value for scanners vector's type
   std::vector<rf627old*> scanners;
   // Search for RF627old devices over network
   scanners = rf627old::search(PROTOCOLS::SERVICE);


   // Print count of discovered RF627Old in network by Service Protocol
   std::cout << "Discovered: " << scanners.size() << " RF627Old"  <<␣
↪std::endl;


   // Iterate over all discovered RF627Old in network, connect to each of
   // them and read/set parameters.
   for(size_t i = 0; i < scanners.size(); i++)
   {

      rf627old::hello_info info = scanners[i]->get_info();

      std::cout << "\n\n\nID scanner's list: " << i                <<␣
↪std::endl;
      std::cout << "----------------------------------------"     <<␣
↪std::endl;

      // Establish connection to the RF627 device by Service Protocol.
      scanners[i]->connect();

      // read params from RF627 device by Service Protocol.
      scanners[i]->read_params();
```

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(продолжение с предыдущей страницы)

```
      // Get parameter of Device Name
      param_t* name = scanners[i]->get_param(PARAM_NAME_KEY::USER_GENERAL_
↪DEVICENAME);
      if (name->type == param_value_types[(int)PARAM_VALUE_TYPE::STRING_PARAM_
↪TYPE])
      {
         std::string str_name = name->get_value<value_str>();
         std::cout << "Current Device Name \t: " << str_name     << std::endl;

         // Add "_TEST" to the ending of the current name
         str_name += "_TEST";
         name->set_value<value_str>(str_name);
         std::cout << "New Device Name \t: " << str_name         << std::endl;
         std::cout << "----------------------------------------"<< std::endl;

         scanners[i]->set_param(name);
      }

      // Get parameter of Device IP Addr
      param_t* ip_addr = scanners[i]->get_param(PARAM_NAME_KEY::USER_NETWORK_
↪IP);
      if (ip_addr->type == param_value_types[(int)PARAM_VALUE_TYPE::UINT32_
↪ARRAY_PARAM_TYPE])
      {
         std::vector <uint32_t> ip = ip_addr->get_value<array_uint32>();
         std::cout << "Current Device IP\t: ";
         for(auto i: ip) std::cout<<std::to_string(i)<<".";std::cout<
↪<std::endl;

         // Change last digit of IP address (e.g. 192.168.1.30 -> 192.168.1.
↪31)
         ip[3]++;
         ip_addr->set_value<array_uint32>(ip);
         std::cout << "New Device IP\t: ";
         for(auto i: ip) std::cout<<std::to_string(i)<<".";std::cout<
↪<std::endl;
         std::cout << "----------------------------------------"<< std::endl;

         scanners[i]->set_param(ip_addr);
      }

      // Get parameter of Laser Enabled
      param_t* laser_enabled = scanners[i]->get_param(PARAM_NAME_KEY::USER_
↪LASER_ENABLED);
      if (laser_enabled->type == param_value_types[(int)PARAM_VALUE_
↪TYPE::UINT_PARAM_TYPE])
      {
         bool isEnabled = laser_enabled->get_value<value_uint32>();
         std::cout<<"Current Laser State\t: "<<(isEnabled?"ON":"OFF")<
↪<std::endl;

         isEnabled = !isEnabled;
         // Change the current state to the opposite
         laser_enabled->set_value<value_uint32>(!isEnabled);
         std::cout<<"New Laser State\t: "<<(isEnabled?"ON":"OFF")<<std::endl;
         std::cout << "----------------------------------------"<< std::endl;
```

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(продолжение с предыдущей страницы)

```
            scanners[i]->set_param(laser_enabled);
        }

        //  Write changes parameters to the device's memory
        scanners[i]->write_params();

    }

    system("pause");

}
```

Ниже приведён результат вывода приложения при успешной установке новых параметров:

```
SDK version: 1.3.0
========================================
Discovered: 1 RF627Old


ID scanner's list: 0
----------------------------------------
Current Device Name   : RF627
New Device Name       : RF627_TEST
----------------------------------------
Current Device IP     : 192.168.1.32.
New Device IP         : 192.168.1.33.
----------------------------------------
Current Laser State   : ON
New Laser State       : OFF
----------------------------------------

Press any key to continue . . .
```

Вы можете открыть и скомпилировать этот пример с помощью **Qt Creator**:

- Загрузите файл CMakeLists.txt из папки **examples/Cpp/RF627_old/RF627_params** через **File > Open File or Project** (выберите файл CMakeLists.txt)
- Выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
- Запустите проект

1.3.3 Компиляция «обёртки» на C#

Эта «обёртка» представляет собой библиотеку .NET, написанную на языке C#, которая может быть использована в приложениях на C#, Visual Basic .NET, C++/CLI и JScript .NET.

Для её использования в проектах .NET разработчик должен собрать или скачать динамическую программную библиотеку **rf62Xsdk.dll**, после чего добавить библиотеку к ссылкам (references) проекта, а также собрать или скачать **rf62Xcore.dll**, добавив её в папку к исполняемому файлу проекта.

Таблица 3: Последние выпуски:

Platform	64bit	Dependencies (x64)
.NET Framework 4.5 (or above)	rf62Xsdk.dll	rf62Xcore.dll

Как скомпилировать

Библиотека-«обёртка» rf62Xsdk может быть скомпилирован при помощи среды разработки Visual Studio.

Во-первых, вы должны загрузить проект (если не сделали этого ранее)

```
git clone https://gitlab.com/riftek_llc/software/sdk/scanners/RF62X-SDK.git
cd RF62X-SDK
git submodule update --init --recursive
```

Примечание: для получения дополнительной информации о шагах загрузки проекта см. *Скачивание проекта*

Visual Studio

- Откройте решение rf62Xsdk.sln по пути **rf62Xwrappers/CSharp/rf62Xsdk** в Visual Studio
- Скомпилируйте проект

Как использовать

Вы можете открыть примеры использования с помощью **Visual Studio**, для этого:

- Откройте решение **RF627_TESTS.sln** из папки **rf62Xwrappers/CSharp/RF627_old**
- Выберите **x64 Debug** или **x64 Release** в качестве целевой платформы
- Добавьте **rf62Xsdk.dll** библиотеку к ссылкам (**references**) проекта
- Скопируйте **rf62Xcore.dll** в путь к исполняемому файлу проекта (**../bin/x64/Debug/** или **../bin/x64/Release/**)
- Скомпилируйте проект

Помимо приведённых ниже примеров использования библиотеки из решении **RF627_TESTS.sln**, где каждый пример может быть скомпилирован и выполнен отдельно, вы также дополнительно можете прочитать документацию на библиотеку-«обёртку» на C#, где каждая функция содержит отдельный пример кода.

Поиск устройств RF62X

Ниже приведен пример поиска сканеров серии RF627Old в сети

```
using System;
using System.Collections.Generic;
using SDK.SCANNERS;

namespace RF627_search
{
    class Program
    {
        static void Main(string[] args)
```

(continues on next page)

(продолжение с предыдущей страницы)

```
        {

            // Start initialization of the library core
            RF62X.SdkInit();

            // Print return rf62X sdk version
            Console.WriteLine("SDK version: {0}", RF62X.SdkVersion());
            Console.WriteLine("========================================");

            // Search for RF627old devices over network
            Console.WriteLine("- Start searching device");
            List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();
            Console.WriteLine("+ {0} scanners detected", Scanners.Count);

            for (int i = 0; i < Scanners.Count; i++)
            {
                RF62X.HelloInfo info = Scanners[i].GetInfo();

                Console.WriteLine("\n\n\nID scanner's list: {0}", i);
                Console.WriteLine("----------------------------------------");
                Console.WriteLine("Device information: ");
                Console.WriteLine("* Name\t: {0}", info.device_name);
                Console.WriteLine("* Serial\t: {0}", info.serial_number);
                Console.WriteLine("* IP Addr\t: {0}", info.ip_address);
                Console.WriteLine("* MAC Addr\t: {0}", info.mac_address);

                Console.WriteLine("Working ranges: ");
                Console.WriteLine("* Zsmr, mm\t: {0}", info.z_smr);
                Console.WriteLine("* Zmr , mm\t: {0}", info.z_mr);
                Console.WriteLine("* Xsmr, mm\t: {0}", info.x_smr);
                Console.WriteLine("* Xemr, mm\t: {0}", info.x_emr);

                Console.WriteLine("\nVersions: ");
                Console.WriteLine("* Firmware\t: {0}", info.firmware_version);
                Console.WriteLine("* Hardware\t: {0}", info.hardware_version);
                Console.WriteLine("----------------------------------------");
            }

            Console.WriteLine("{0}Press any key to end \"Search-test\"",␣
↪Environment.NewLine);
            Console.ReadKey();

        }
    }
}
```

Получение профиля сканера

Ниже приведен пример получения профилей от сканеров серии RF627Old

```
using System;
using System.Collections.Generic;
using SDK.SCANNERS;

namespace RF627_profile
{
   class Program
   {
      static void Main(string[] args)
      {

         // Start initialization of the library core
         RF62X.SdkInit();


         // Search for RF627old devices over network
         Console.WriteLine("- Start searching device");
         List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();
         Console.WriteLine("+ {0} scanners detected", Scanners.Count);


         // foreach over an scanners list
         for (int i = 0; i < Scanners.Count; i++)
         {
            RF62X.HelloInfo info = Scanners[i].GetInfo();

            Console.WriteLine("\n\n\nID scanner's list: {0}", i);
            Console.WriteLine("----------------------------------------");
            Console.WriteLine("Device information: ");
            Console.WriteLine("* Name\t: {0}", info.device_name);
            Console.WriteLine("* Serial\t: {0}", info.serial_number);
            Console.WriteLine("* IP Addr\t: {0}", info.ip_address);

            // Establish connection to the RF627 device by Service Protocol.
            Scanners[i].Connect();

            // Get profile from scanner's data stream by Service Protocol.
            RF62X.Profile profile = Scanners[i].GetProfile();
            if (profile.header != null)
            {
               Console.WriteLine("Profile information: ");
               switch (profile.header.data_type)
               {
                  case RF62X.PROFILE_TYPE.PIXELS_NORMAL:
                     Console.WriteLine("* DataType\t: PIXELS");
                     Console.WriteLine("* Count\t: {0}", profile.pixels.
↪Count);
                     break;
                  case RF62X.PROFILE_TYPE.PROFILE_NORMAL:
                     Console.WriteLine("* DataType\t: PROFILE");
                     Console.WriteLine("* Size\t: {0}", profile.points.Count);
                     break;
                  case RF62X.PROFILE_TYPE.PIXELS_INTERPOLATED:
                     Console.WriteLine("* DataType\t: PIXELS");
```

(continues on next page)

(продолжение с предыдущей страницы)

```
                    Console.WriteLine("* Count\t: {0}", profile.pixels.
↪Count);
                    break;
                case RF62X.PROFILE_TYPE.PROFILE_INTERPOLATED:
                    Console.WriteLine("* DataType\t: PROFILE");
                    Console.WriteLine("* Size\t: {0}", profile.points.Count);
                    break;
                default:
                    break;
            }
            Console.WriteLine("Profile was successfully received!");
            Console.WriteLine("----------------------------------------");
        }else
        {
            Console.WriteLine("Profile was not received!");
            Console.WriteLine("----------------------------------------");
        }
    }

    Console.WriteLine("{0}Press any key to end \"Search-test\"",␣
↪Environment.NewLine);
    Console.ReadKey();
  }
 }
}
```

Получение и установка параметров

Ниже приведен пример получения и изменения имени сканера, установки IP адреса, смены состояния лазера (включение или отключение):

```
using System;
using System.Collections.Generic;
using SDK.SCANNERS;

namespace RF627_params
{
   class Program
   {
      static void Main(string[] args)
      {

         // Start initialization of the library core
         RF62X.SdkInit();

         // Search for RF627old devices over network
         Console.WriteLine("- Start searching device");
         List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();
         Console.WriteLine("+ {0} scanners detected", Scanners.Count);

         // foreach over an scanners list
         for (int i = 0; i < Scanners.Count; i++)
         {
            // Establish connection to the RF627 device by Service Protocol.
            Scanners[i].Connect();
```

(continues on next page)

(продолжение с предыдущей страницы)

```
            // read params from RF627 device by Service Protocol.
            Scanners[i].ReadParams();

            // Get parameter of Device Name
            RF62X.Param<string> name = Scanners[i].GetParam(RF62X.Params.User.
↪General.deviceName);
            if (name != null)
            {
                string strName = name.GetValue();
                Console.WriteLine("\n\nCurrent Device Name \t: {0}", strName);

                // Add "_TEST" to the ending of the current name
                strName += "_TEST";
                name.SetValue(strName);
                Console.WriteLine("New Device Name \t: {0}", strName);
                Console.WriteLine("----------------------------------------");

                Scanners[i].SetParam(name);
            }

            // Get parameter of Device IP Addr
            RF62X.Param<List<uint>> ipAddr = Scanners[i].GetParam(RF62X.
↪Params.User.NetWork.ip);
            if (ipAddr != null)
            {
                List<uint> ip = ipAddr.GetValue();
                Console.WriteLine("Current Device IP Addr\t: {0}.{1}.{2}.{3}",␣
↪ip[0], ip[1], ip[2], ip[3]);

                // Change last digit of IP address (e.g. 192.168.1.30 -> 192.
↪168.1.31)
                ip[3]++;
                ipAddr.SetValue(ip);
                Console.WriteLine("New Device IP Addr\t: {0}.{1}.{2}.{3}",␣
↪ip[0], ip[1], ip[2], ip[3]);
                Console.WriteLine("----------------------------------------");

                Scanners[i].SetParam(ipAddr);
            }

            // Get parameter of Laser Enabled
            RF62X.Param<uint> laserEnabled = Scanners[i].GetParam(RF62X.
↪Params.User.Laser.enabled);
            if (laserEnabled != null)
            {
                bool isLaserEnabled = Convert.ToBoolean(laserEnabled.
↪GetValue());
                Console.WriteLine("Current Laser State\t: {0}", isLaserEnabled␣
↪? "ON" : "OFF");

                // Change the current state to the opposite
                isLaserEnabled = !isLaserEnabled;
                laserEnabled.SetValue((uint)(Convert.
↪ToUInt32(isLaserEnabled)));
                Console.WriteLine("New Laser State\t\t: {0}", isLaserEnabled ?
↪"ON" : "OFF");
```

(continues on next page)

(продолжение с предыдущей страницы)

```
                Console.WriteLine("----------------------------------------");

                Scanners[i].SetParam(laserEnabled);
            }

            Scanners[i].WriteParams();
        }
        Console.WriteLine("{0}Press any key to end \"Parameters-test\"",␣
↪Environment.NewLine);
        Console.ReadKey();
    }
  }
}
```

1.4 Дополнительная информация

1.4.1 PARAMETERS

Description of device parameters. All device parameters are readable. Those parameters that cannot be written without authorization as manufacturer have «awrite» access type. If no minimum value is specified for a parameter, the minimum value corresponds to the minimum value of the parameter type. If no maximum value is specified, it corresponds to the maximum value of the parameter type.

The main elements of the parameter description:

- **Access** - describes the availability of the parameter for reading and writing.
  - read - parameter is readable,
  - write - parameter is writable by user,
  - awrite - parameter is writable after authorization as a manufacturer

- **Type** - the data type of the parameter. - uint32_t - unsigned integer, 32 bits,
  - uint64_t - unsigned integer, 64 bits,
  - int32_t - signed integer, 32 bits,
  - int64_t - signed integer, 64 bits,
  - float_t - floating point, 32 bits,
  - double_t - floating point, 64 bits,
  - u32_arr_t - array of unsigned integer, 32 bits,
  - u64_arr_t - array of unsigned integer, 64 bits,
  - i32_arr_t - array of signed integer, 32 bits,
  - i64_arr_t - array of signed integer, 64 bits,
  - flt_array_t - array of floating point, 32 bits,
  - dbl_array_t - array of floating point, 64 bits,
  - string_t - string, ending with «0», the maximum length of the string is specified in the parameter description

- **Min value** - minimum parameter value, writing a value less than this is not allowed. If no minimum
  value is specified, it is defined by the type of parameter.

- **Max value** - maximum parameter value, writing a value greater than this is
  not allowed. If no maximum value is specified, it is defined by the type
  of parameter.

- **Step** - step with which it is allowed to change the
  parameter value. Values that do not match the step will not be set. If
  no step is specified, any parameter change is allowed.

- **Enum** - enumeration of valid parameter values. Values that do not match the
  enumeration will not be set.

- **Default value** - default value of the parameter, set by the manufacturer
  or after switching on the device (depending on the parameter).

User

- **user_general_deviceState** - Current device state - combination
  of enum values. The device changes the value of this parameter when
  initializing the equipment, transferring important data over the
  network (e.g. firmware), updating the firmware and in other cases. In
  all modes except DEV_STATE_NORMAL, the device can pause the
  transfer of profiles and other data not related to the current
  operating mode.
  - *Access*: read
  - *Type*: uint32_t
  - *Min value*: DEV_STATE_NORMAL
  - *Max value*: DEV_STATE_HARDWARE_INIT
  - *Enum*:
    - DEV_STATE_NORMAL - the device operates in normal mode,
    - DEV_STATE_CALIB_FILE_RCV - the device receives a
      calibration file,
    - DEV_STATE_CALIB_FILE_SND - the device is transfer
      calibration file,
    - DEV_STATE_CALIB_FILE_SAVE - the device saves the
      calibration file to the internal flash drive,
    - DEV_STATE_FIRMWARE_RCV - device receives firmware,
    - DEV_STATE_FIRMWARE_SND - the device is transfer firmware,
    - DEV_STATE_FIRMWARE_SAVE - the device saves the firmware file
      to the internal flash drive,

  - DEV_STATE_ETH_INIT - the device initializes hardware and
    software for ethernet connection,
  - DEV_STATE_DUMP_DOWNLOAD - the device transfers dump data,
  - DEV_STATE_ETH_EXCESS - required connection speed exceeds
    current value for ethernet connection,
  - DEV_STATE_HARDWARE_INIT - device initializes hardware
- *Default value*: DEV_STATE_NORMAL

- **user_general_deviceName** - User-defined scanner name. It is
  displayed on the web page of the scanner and can be used to quickly
  identify scanners.
  - *Access*: read/write
  - *Type*: string_t
  - *Max len*: 128
  - *Default value*: «2D laser scanner»

- **user_general_logSaveEnabled** - Allow automatic log saving after
  device boot and after critical events. When this option is enabled,
  it slightly (~ 100ms) increases the time until the device is ready
  for operation.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: FALSE
  - *Max value*: TRUE
  - *Default value*: FALSE

- **user_general_logSize** - The current size (number of records) of
  the device's internal log file.
  - *Access*: read
  - *Type*: uint32_t
  - *Default value*: 0

- **user_sysMon_fpgaTemp** - The current temperature of the FPGA
  (internal computing module) of the device.
  - *Access*: read
  - *Type*: float_t
  - *Min value*: -100
  - *Max value*: +100
  - *Default value*: 0
  - *Units*: °C

- **user_sysMon_paramsChanged** - Device settings have been changed
  but not saved.

- *Access*: read
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_sysMon_tempSens00** - Current temperature inside the device case, measured by the sensor with address 00.
  - *Access*: read
  - *Type*: float_t
  - *Min value*: -100
  - *Max value*: +100
  - *Default value*: 0
  - *Units*: °C

- **user_sysMon_tempSens00Max** - Maximum temperature fixed by sensor with address 00.
  - *Access*: read
  - *Type*: float_t
  - *Min value*: -100
  - *Max value*: +100
  - *Default value*: 0
  - *Units*: °C

- **user_sysMon_tempSens00Min** - Minimum temperature fixed by sensor with address 00.
  - *Access*: read
  - *Type*: float_t
  - *Min value*: -100
  - *Max value*: +100
  - *Default value*: 0
  - *Units*: °C

- **user_sysMon_tempSens01** - Current temperature inside the device case, measured by the sensor with address 01.
  - *Access*: read
  - *Type*: float_t
  - *Min value*: -100
  - *Max value*: +100
  - *Default value*: 0
  - *Units*: °C

- **user_sysMon_tempSens01Max** - Maximum temperature fixed by sensor

with address 01.
- *Access*: read
- *Type*: float_t
- *Min value*: -100
- *Max value*: +100
- *Default value*: 0
- *Units*: °C

- **user_sysMon_tempSens01Min** - Minimum temperature fixed by sensor
with address 01.
- *Access*: read
- *Type*: float_t
- *Min value*: -100
- *Max value*: +100
- *Default value*: 0
- *Units*: °C

- **user_sysMon_tempSens10** - Current temperature inside the device
case, measured by the sensor with address 10.
- *Access*: read
- *Type*: float_t
- *Min value*: -100
- *Max value*: +100
- *Default value*: 0
- *Units*: °C

- **user_sysMon_tempSens10Max** - Maximum temperature fixed by sensor
with address 10.
- *Access*: read
- *Type*: float_t
- *Min value*: -100
- *Max value*: +100
- *Default value*: 0
- *Units*: °C

- **user_sysMon_tempSens10Min** - Minimum temperature fixed by sensor
with address 10.
- *Access*: read
- *Type*: float_t
- *Min value*: -100
- *Max value*: +100
- *Default value*: 0
- *Units*: °C

- **user_sysMon_tempSens11** - Current temperature inside the device case, measured by the sensor with address 11.
  - *Access*: read
  - *Type*: float_t
  - *Min value*: -100
  - *Max value*: +100
  - *Default value*: 0
  - *Units*: °C

- **user_sysMon_tempSens11Max** - Maximum temperature fixed by sensor with address 11.
  - *Access*: read
  - *Type*: float_t
  - *Min value*: -100
  - *Max value*: +100
  - *Default value*: 0
  - *Units*: °C

- **user_sysMon_tempSens11Min** - Minimum temperature fixed by sensor with address 11.
  - *Access*: read
  - *Type*: float_t
  - *Min value*: -100
  - *Max value*: +100
  - *Default value*: 0
  - *Units*: °C

- **user_sensor_syncSource** - Measurement synchronization source.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: SYNC_INTERNAL
  - *Max value*: SYNC_SOFTWARE
  - *Enum*:
    - SYNC_INTERNAL - start of measurements from the device's internal generator,
    - SYNC_EXTERNAL - start of measurements from an external source,
    - SYNC_SOFTWARE - start of measurements by software request
  - *Default value*: SYNC_INTERNAL

- **user_sensor_framerate** - Frame rate of the CMOS-sensor, sets the measurement frequency. The value to be written should not exceed the value of the parameter **user_sensor_maxFramerate**.
  - *Access*: read/write

- *Type*: uint32_t
- *Min value*: 1
- *Max value*: 20000
- *Default value*: 490
- *Units*: Hz

- **user_sensor_maxFramerate** - Maximum frame rate (measurement frequency) for the current operation mode.
  - *Access*: read
  - *Type*: uint32_t
  - *Min value*: 1
  - *Max value*: 20000
  - *Default value*: 490
  - *Units*: Hz

- **user_sensor_exposureControl** - CMOS-sensor exposure control method.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: EXPOSE_AUTO
  - *Max value*: EXPOSE_MULTI_3
  - *Enum*:
    - EXPOSE_AUTO - automatic exposure control based on profile analysis,
    - EXPOSE_FIXED - exposure time is user-defined,
    - EXPOSE_MULTI_2 - mode with 2 exposures, used to obtain a profile on surfaces with different levels of reflection,
    - EXPOSE_MULTI_3 - mode with 3 exposures, used to obtain a profile on surfaces with different levels of reflection
  - *Default value*: EXPOSE_FIXED

- **user_sensor_exposure1** - Frame exposure time in EXPOSE_AUTO and EXPOSE_FIXED modes.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: 3000
  - *Max value*: 300000000
  - *Step*: 100
  - *Default value*: 300000
  - *Units*: ns

- **user_sensor_exposure2** - Frame #2 exposure time in EXPOSE_MULTI_2 mode.

- *Access*: read/write
- *Type*: uint32_t
- *Min value*: 3000
- *Max value*: 300000000
- *Step*: 100
- *Default value*: 300000
- *Units*: ns

- **user_sensor_exposure3** - Frame #3 exposure time in EXPOSE_MULTI_2 mode.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: 3000
  - *Max value*: 300000000
  - *Step*: 100
  - *Default value*: 300000
  - *Units*: ns

- **user_sensor_maxExposure** - Maximum frame exposure time in the current device mode.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: 3000
  - *Max value*: 300000000
  - *Step*: 100
  - *Default value*: 300000
  - *Units*: ns

- **user_sensor_defectivePixels** - Array of coordinates [X1, Y1, X2, Y2, … X15, Y15] of the sensor's defective pixels.
  - *Access*: read/write
  - *Type*: u32_arr_t
  - *Max value*: 4096
  - *Max elements*: 32,
  - *Default value*: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]

- **user_sensor_doubleSpeedEnabled** - Turns on and off the sensor's double frame rate mode. Enabling this mode allows almost double the frequency of measurements (profiles per second) by reducing accuracy in the Z-axis.
  - *Access*: read/write
  - *Type*: uint32_t

- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_sensor_edrType** - Enable CMOS-sensor operation in the extended dynamic range. Allows get a quality profile on light and dark surfaces.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: EDR_DISABLE
  - *Max value*: EDR_COLUMN
  - *Enum*:
    - EDR_DISABLE - extended dynamic range mode disabled,
    - EDR_COLUMN - different exposure mode for even and odd columns
  - *Default value*: EDR_DISABLE

- **user_sensor_edrColumnDivider** - Exposure time divider for odd columns. This parameter controls the sensitivity to very bright areas of the profile.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: 2
  - *Max value*: 32
  - *Default value*: 2

- **user_roi_enabled** - Turns on and off the mode of obtaining measurements in the region of interest.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: FALSE
  - *Max value*: TRUE
  - *Default value*: FALSE

- **user_roi_active** - Indicates the status of the ROI in automatic positioning mode. In the automatic position control mode, if the profile is not detected, the activity switches to the FALSE state, when the profile is detected, the parameter switches to the TRUE state. In manual positioning mode, the parameter is always TRUE.
  - *Access*: read
  - *Type*: uint32_t
  - *Min value*: FALSE
  - *Max value*: TRUE
  - *Default value*: FALSE

- **user_roi_posMode** - ROI position control mode.
    - *Access*: read/write
    - *Type*: uint32_t
    - *Min value*: ROI_POSITION_MANUAL
    - *Max value*: ROI_POSITION_AUTO
    - *Enum*:
        - ROI_POSITION_MANUAL - ROI position is set by the user,
        - ROI_POSITION_AUTO - ROI automatic position control with profile holding in the center
    - *Default value*: ROI_POSITION_MANUAL

- **user_roi_pos** - Current position of the upper edge of the ROI in the sensor lines.
    - *Access*: read/write
    - *Type*: uint32_t
    - *Max value*: 1280
    - *Default value*: 100
    - *Units*: lines

- **user_roi_maxPos** - Maximum position of the upper limit of the ROI in the current operating mode of the device.
    - *Access*: read
    - *Type*: uint32_t
    - *Max value*: 1280
    - *Default value*: 1180
    - *Units*: lines

- **user_roi_size** - Sets the size of the area in the lines where the profile is searched and processed.
    - *Access*: read/write
    - *Type*: uint32_t
    - *Min value*: 8
    - *Max value*: 488
    - *Step*: 8
    - *Default value*: 64
    - *Units*: lines

- **user_roi_reqProfSize** - Minimum required number of profile points for activating an ROI in ROI_POSITION_AUTO mode.
    - *Access*: read/write
    - *Type*: uint32_t
    - *Max value*: 1280
    - *Step*: 64

- *Default value*: 320
- *Units*: points

- **user_roi_zsmr** - ROI start position in mm.
  - *Access*: read
  - *Type*: float_t
  - *Max value*: 10000
  - *Default value*: 0
  - *Units*: mm

- **user_roi_zemr** - ROI end position in mm.
  - *Access*: read
  - *Type*: float_t
  - *Max value*: 10000
  - *Default value*: 0
  - *Units*: mm

- **user_network_speed** - Current Ethernet connection speed. The connection speed is changed by writing to this parameter. In case of auto-negotiation, writing is ignored.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: LINK_SPEED_10MBIT
  - *Max value*: LINK_SPEED_1GBIT
  - *Enum*:
    - LINK_SPEED_10MBIT - the connection speed is 10 Mbs, currently almost unused,
    - LINK_SPEED_100MBIT - the connection speed is 100 Mbs,
    - LINK_SPEED_1GBIT - the connection speed is 1000 Mbs
  - *Default value*: LINK_SPEED_1GBIT
  - *Units*: Mbps

- **user_network_requiredSpeed** - The required Ethernet connection speed in the current device operation mode. Depends on the number of profiles per second, the number of points in the profile, etc.
  - *Access*: read
  - *Type*: uint32_t
  - *Min value*: 1
  - *Max value*: 10000
  - *Default value*: 1
  - *Units*: Mbps

- **user_network_autoNeg** - Turns on and off the automatic

negotiation of the Ethernet connection speed.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: TRUE

- **user_network_ip** - The network address of the device.
- *Access*: read/write
- *Type*: u32_arr_t
- *Max value*: 255
- *Max elements*: 4,
- *Default value*: [192, 168, 1, 30]

- **user_network_mask** - Subnet mask for the device.
- *Access*: read/write
- *Type*: u32_arr_t
- *Max value*: 255
- *Max elements*: 4,
- *Default value*: [255, 255, 255, 0]

- **user_network_gateway** - Gateway address.
- *Access*: read/write
- *Type*: u32_arr_t
- *Max value*: 255
- *Max elements*: 4,
- *Default value*: [192, 168, 1, 1]

- **user_network_hostIP** - The network address of the device to which profiles and calculation results are sent using the UDP protocol.
- *Access*: read/write
- *Type*: u32_arr_t
- *Max value*: 255
- *Max elements*: 4,
- *Default value*: [192, 168, 1, 2]

- **user_network_hostPort** - The port number on the device to which profiles and calculation results are sent over the UDP protocol.
- *Access*: read/write
- *Type*: uint32_t
- *Max value*: 65535
- *Default value*: 50001

- **user_network_webPort** - Port number to access the Web page.
    - *Access*: read/write
    - *Type*: uint32_t
    - *Max value*: 65535
    - *Default value*: 80

- **user_network_servicePort** - Port number for service protocol.
    - *Access*: read/write
    - *Type*: uint32_t
    - *Max value*: 65535
    - *Default value*: 50011

- **user_streams_udpEnabled** - Enabling and disabling the profile stream, transmitted via the UDP protocol (sending to the network address, set by the user_network_hostIP parameter and the port, set by the user_network_hostPort parameter).
    - *Access*: read/write
    - *Type*: uint32_t
    - *Min value*: FALSE
    - *Max value*: TRUE
    - *Default value*: FALSE

- **user_streams_format** - The format of the transmitted profiles.
    - *Access*: read/write
    - *Type*: uint32_t
    - *Min value*: DATA_FORMAT_RAW_PROFILE
    - *Max value*: DATA_FORMAT_PROFILE
    - *Enum*:
        - DATA_FORMAT_RAW_PROFILE - the position of the points in the profile is transferred without applying calibration data, in subpixel values. Used for debugging and setting up the device, allows to compare the image, generated by the CMOS-sensor and the calculated profile position,
        - DATA_FORMAT_PROFILE - the position of the points in the profile is transmitted in discretes, the main format for the operation of the device
    - *Default value*: DATA_FORMAT_PROFILE

- **user_streams_pointsCount** - The number of points in the profile that the device calculates and transmits.
    - *Access*: read/write
    - *Type*: uint32_t
    - *Min value*: 648

- *Max value*: 1296
- *Step*: 648
- *Default value*: 648
- *Units*: points

- **user_streams_includeIntensity** - Enable or disable the transfer of brightness points in the profile. The brightness values are transferred after the profile data in the format of 1 byte per point, 0 - black … 255 - white.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_streams_udpPacketsCounter** - Internal counter of transmitted UDP packets with profiles. It can be used to control the loss of packets with profiles.
- *Access*: read/write
- *Type*: uint32_t
- *Default value*: 0

- **user_processing_threshold** - Threshold of profile points detection. Smaller values of the parameter allow detect the profile at a lower brightness of the signal, which may cause false detections on flare and reflections. Higher parameter values require higher signal brightness, but provide confident detection of the profile position.
- *Access*: read/write
- *Type*: uint32_t
- *Max value*: 100
- *Default value*: 2
- *Units*: %

- **user_processing_profPerSec** - The number of processed profiles per second.
- *Access*: read
- *Type*: uint32_t
- *Max value*: 20000
- *Default value*: 490
- *Units*: pps

- **user_processing_medianMode** - Enable and width of median profile

filtering. The median filter allows remove random outliers and fill the gaps in the profile with a width of up to half the size of the filter.
- *Access*: read/write
- *Type*: uint32_t
- *Max value*: 15
- *Enum*:
    - 0 - the filter is disabled,
    - 3 - the filter is enabled, filter size is 3 points,
    - 5 - the filter is enabled, filter size is 5 points,
    - 7 - the filter is enabled, filter size is 7 points,
    - 9 - the filter is enabled, filter size is 9 points,
    - 11 - the filter is enabled, filter size is 11 points,
    - 13 - the filter is enabled, filter size is 13 points,
    - 14 - the filter is enabled, filter size is 15 points,
- *Default value*: 0

- **user_processing_bilateralMode** - Bilateral filter allows smooth the values of the points of the profile, while maintaining its sharp changes.
- *Access*: read/write
- *Type*: uint32_t
- *Max value*: 15
- *Enum*:
    - 0 - the filter is disabled,
    - 3 - the filter is enabled, filter size is 3 points,
    - 5 - the filter is enabled, filter size is 5 points,
    - 7 - the filter is enabled, filter size is 7 points,
    - 9 - the filter is enabled, filter size is 9 points,
    - 11 - the filter is enabled, filter size is 11 points,
    - 13 - the filter is enabled, filter size is 13 points,
    - 14 - the filter is enabled, filter size is 15 points,
- *Default value*: 0

- **user_processing_peakMode** - Profile peak detection mode for position calculation. Used to ignore reflections and highlights.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: PEAK_MODE_INTENSITY
- *Max value*: PEAK_MODE_NUMBER_4
- *Enum*:
    - PEAK_MODE_INTENSITY - the position of the profile points is calculated at maximum intensity,
    - PEAK_MODE_FIRST - the position of the profile points is

calculated from the first overstepping of the detection threshold,
- PEAK_MODE_LAST - the position of the profile points is calculated from the last overstepping of the detection threshold,
- PEAK_MODE_NUMBER_2 - when calculating the position of profile points, the advantage is given to peak #2,
- PEAK_MODE_NUMBER_3 - when calculating the position of profile points, the advantage is given to peak #3,
- PEAK_MODE_NUMBER_4 - when calculating the position of profile points, the advantage is given to peak #4

- *Default value*: PEAK_MODE_INTENSITY

- **user_processing_flip** - Profile reflection mode. Reflection applies only if **user_streams_format** is set to DATA_FORMAT_PROFILE.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: FLIP_MODE_OFF
  - *Max value*: FLIP_MODE_XZ
  - *Enum*:
    - FLIP_MODE_OFF - no reflections,
    - FLIP_MODE_X - reflection along the X axis,
    - FLIP_MODE_Z - reflection along the Z axis,
    - FLIP_MODE_XZ - reflection along the X and Z axis
  - *Default value*: FLIP_MODE_OFF

- **user_laser_enabled** - Switching the laser radiation on and off.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: FALSE
  - *Max value*: TRUE
  - *Default value*: FALSE

- **user_laser_value** - Sets the brightness of the laser radiation.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Max value*: 100
  - *Step*: 5
  - *Default value*: 0
  - *Units*: %

- **user_trigger_sync_source** - Selection of inputs and their

combinations for synchronization of measurements.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: TRIG_SOURCE_IN1
- *Max value*: TRIG_SOURCE_IN1_AND_IN2
- *Enum*:
    - TRIG_SOURCE_IN1 - trigger measurements on an event at input 1,
    - TRIG_SOURCE_IN2 - trigger measurements on an event at input 2,
    - TRIG_SOURCE_IN1_OR_IN2 - trigger measurements on an event at input 1 **or** input 2,
    - TRIG_SOURCE_IN1_AND_IN2 - trigger measurements on an event at input 1 **and** input 2
- *Default value*: TRIG_SOURCE_IN1

- **user_trigger_sync_strictEnabled** - Enable or disable strict synchronization mode. When this mode is enabled, synchronization events that occurred during a frame exposure will be ignored and the next measurement will only be triggered by the synchronization event, when the sensor has finished exposing the previous frame. In this case, if the synchronization event rate is slightly higher than the maximum frame rate of the sensor, the number of profiles per second will be lower than the maximum frame rate due to the stroboscopic effect. If the mode is off and there were synchronization events during the exposure, the next measurement will start as soon as the sensor finishes exposing the previous frame. In any situation, the encoder value in the profile will be recorded at the middle of the frame exposure.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_trigger_sync_divider** - The synchronization event divider. Does not affect the encoder counter.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: 1
- *Max value*: 8192
- *Default value*: 1

- **user_trigger_sync_delay** - The value of the delay in the start

of measurement (start of frame exposure) relative to the
synchronization event.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: 700
- *Max value*: 100000000
- *Step*: 100
- *Default value*: 700
- *Units*: ns

- **user_trigger_sync_value** - The value of the internal
measurement start counter. Shows the number of measurements taken.
- *Access*: read/write
- *Type*: uint32_t
- *Default value*: 0

- **user_trigger_counter_type** - Type of encoder counter (internal
pulse counter) at synchronization inputs.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: TRIG_COUNTER_UNIDIR
- *Max value*: TRIG_COUNTER_BIDIR
- *Enum*:
    - TRIG_COUNTER_UNIDIR - unidirectional counter, that does not
      take into account the phase of the signals at inputs 1 and 2,
    - TRIG_COUNTER_BIDIR - bidirectional counter, that takes into
      account the phase of the signals at inputs 1 and 2, and can
      both increase and decrease
- *Default value*: TRIG_COUNTER_UNIDIR

- **user_trigger_counter_maxValue** - The maximum value of the
encoder counter, upon reaching which it is reset to the 0.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: 1
- *Max value*: 4294967295
- *Default value*: 4294967295

- **user_trigger_counteraser_resetTimerEnabled** - Enabling and
disabling the timer for automatically resetting the encoder counter
to 0. If the timer is enabled, then if no synchronization events
during the time, specified by the
user_trigger_counter_resetTimerValue parameter, the encoder

counter will be reset to 0.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_trigger_counter_resetTimerValue** - Timeout value until the encoder counter value is automatically reset to 0.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: 100
- *Max value*: 4294967295
- *Step*: 1000
- *Default value*: 4294967295
- *Units*: ns

- **user_trigger_counter_value** - Encoder counter value. This is an internal event counter at inputs 1 and 2.
- *Access*: read/write
- *Type*: uint32_t
- *Default value*: 0

- **user_trigger_counter_dir** - The ratio of the phases of the signals at inputs 1 and 2. Determines the direction of movement if using a movement system.
- *Access*: read
- *Type*: uint32_t
- *Default value*: 0

- **user_input1_enabled** - Turning the input 1 on and off. If the input is turned off, then all signals will be ignored.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_input1_mode** - Input 1 operation mode. Defines which signal change is a synchronization event for a given input.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: IN1_MODE_RISE_OR_FALL

- *Max value*: IN1_MODE_LVL0
- *Enum*:
    - IN1_MODE_RISE_OR_FALL - the synchronization event is both the transition from low to high state (edge of the pulse) and from high to low state (fall of the pulse),
    - IN1_MODE_RISE - the synchronization event is only the transition from low to high state (edge of the pulse),
    - IN1_MODE_FALL - the synchronization event is only the transition from high to low (fall of the pulse),
    - IN1_MODE_LVL1 - the synchronization event is a high level at the input, measures starts from the internal generator,
    - IN1_MODE_LVL0 - the synchronization event is a low level at the input, measures starts from the internal generator
- *Default value*: IN1_MODE_RISE_OR_FALL

- **user_input2_enabled** - Turning the input 2 on and off. If the input is turned off, then all signals will be ignored.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Default value*: FALSE

- **user_input2_mode** - Input 2 operation mode. Defines which signal change is a synchronization event for a given input.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: IN2_MODE_RISE_OR_FALL
- *Max value*: IN2_MODE_LVL0
- *Enum*:
    - IN2_MODE_RISE_OR_FALL - the synchronization event is both the transition from low to high state (edge of the pulse) and from high to low state (fall of the pulse),
    - IN2_MODE_RISE - the synchronization event is only the transition from low to high state (edge of the pulse),
    - IN2_MODE_FALL - the synchronization event is only the transition from high to low (fall of the pulse),
    - IN2_MODE_LVL1 - the synchronization event is a high level at the input, measures starts from the internal generator,
    - IN2_MODE_LVL0 - the synchronization event is a low level at the input, measures starts from the internal generator
- *Default value*: IN2_MODE_RISE_OR_FALL

- **user_input3_enabled** - Turning the input 3 on and off. If the input is turned off, then all signals will be ignored.

- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_input3_mode** - Input 3 operation mode. This input is mainly used to reset the encoder counter value.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: IN3_MODE_RISE
  - *Max value*: IN3_MODE_FALL
  - *Enum*:
    - IN3_MODE_RISE - reset the encoder counter value at the rising edge of the pulse at the input,
    - IN3_MODE_FALL - reset the encoder counter value at the falling edge of the pulse at the input
  - *Default value*: IN3_MODE_RISE

- **user_input1_samples** - An array of signal values at input 1. The parameter is a time scan of the signals at input 1. Every 2 bits indicate the state of the signal at a certain point in time. Value 0b00 - low signal level, 0b01 - state changed (pulses), 0b10 - reserved, 0b11 - high level.
  - *Access*: read/write
  - *Type*: u32_arr_t
  - *Max elements*: 6,
  - *Default value*: [0, 0, 0, 0, 0, 0]

- **user_input2_samples** - An array of signal values at input 2. The parameter is a time scan of the signals at input 2. Every 2 bits indicate the state of the signal at a certain point in time. Value 0b00 - low signal level, 0b01 - state changed (pulses), 0b10 - reserved, 0b11 - high level.
  - *Access*: read/write
  - *Type*: u32_arr_t
  - *Max elements*: 6,
  - *Default value*: [0, 0, 0, 0, 0, 0]

- **user_input3_samples** - An array of signal values at input 3. The parameter is a time scan of the signals at input 3. Every 2 bits indicate the state of the signal at a certain point in time. Value 0b00 - low signal level, 0b01 - state changed (pulses), 0b10 -

reserved, 0b11 - high level.
- *Access*: read/write
- *Type*: u32_arr_t
- *Max elements*: 6,
- *Default value*: [0, 0, 0, 0, 0, 0]

- **user_output1_enabled** - Turning output 1 on and off. When turned off, the output is low. In the on state, the signal is set by the parameters **user_output1_mode** and **user_output1_pulseWidth**.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_output1_mode** - Output 1 mode. Sets which signal will be output.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: OUT_MODE_EXPOSE_START
- *Max value*: OUT_MODE_IN3_REPEATER
- *Enum*:
    - OUT_MODE_EXPOSE_START - impulse at the moment the frame starts to be exposed for the next measurement,
    - OUT_MODE_EXPOSE_TIME - pulse during the exposure of the frame for the next measurement,
    - OUT_MODE_IN1_REPEATER - input 1 repeater, regardless of whether the input is on or off,
    - OUT_MODE_IN2_REPEATER - input 2 repeater, regardless of whether the input is on or off,
    - OUT_MODE_IN3_REPEATER - input 3 repeater, regardless of whether the input is on or off
- *Default value*: OUT_MODE_EXPOSE_START

- **user_output1_pulseWidth** - Pulse width when **user_output1_mode** parameter has value OUT_MODE_EXPOSE_START.
- *Access*: read
- *Type*: uint32_t
- *Min value*: 10
- *Max value*: 1000000
- *Step*: 10
- *Default value*: 1000
- *Units*: ns

- **user_output2_enabled** - Turning output 2 on and off. When turned off, the output is low. In the on state, the signal is set by the parameters **user_output2_mode** and **user_output2_pulseWidth**.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: FALSE
  - *Max value*: TRUE
  - *Default value*: FALSE

- **user_output2_mode** - Output 2 mode. Sets which signal will be output.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: OUT_MODE_EXPOSE_START
  - *Max value*: OUT_MODE_IN3_REPEATER
  - *Enum*:
    - OUT_MODE_EXPOSE_START - impulse at the moment the frame starts to be exposed for the next measurement,
    - OUT_MODE_EXPOSE_TIME - pulse during the exposure of the frame for the next measurement,
    - OUT_MODE_IN1_REPEATER - input 1 repeater, regardless of whether the input is on or off,
    - OUT_MODE_IN2_REPEATER - input 2 repeater, regardless of whether the input is on or off,
    - OUT_MODE_IN3_REPEATER - input 3 repeater, regardless of whether the input is on or off
  - *Default value*: OUT_MODE_EXPOSE_START

- **user_output2_pulseWidth** - Pulse width when **user_output2_mode** parameter has value OUT_MODE_EXPOSE_START.
  - *Access*: read
  - *Type*: uint32_t
  - *Min value*: 10
  - *Max value*: 1000000
  - *Step*: 10
  - *Default value*: 1000
  - *Units*: ns

- **user_dump_enabled** - Enabling profile recording in the internal memory of the device - forming a dump. The recording will be stopped when the maximum dump capacity is reached, either when **user_dump_capacity** is reached or when FALSE is written to this parameter. Before starting the dump recording, user_trigger_sync_value and user_trigger_counter_value counters

will be reset to 0.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

- **user_dump_capacity** - User-defined number of profiles to be dumped. Upon reaching this value, the recording will automatically stop and the value of the **user_dump_enabled** parameter will become FALSE.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: 1
- *Max value*: 80000
- *Default value*: 80000
- *Units*: profiles

- **user_dump_size** - The current number of profiles in the dump. Before starting dump recording, this value is reset to 0. During dump recording, this value increases.
- *Access*: read
- *Type*: uint32_t
- *Max value*: 80000
- *Default value*: 0
- *Units*: profiles

- **user_dump_timeStamp** - The time stamp of the dump. Setted by the device when the dump recording starts.
- *Access*: read
- *Type*: uint64_t
- *Default value*: 0
- *Units*: ticks

- **user_dump_view3d_motionType** - Type of movement system on which the device is installed. The value of the parameter is used to correctly draw the dump as a 3D model.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: MOTION_TYPE_LINEAR
- *Max value*: MOTION_TYPE_RADIAL
- *Enum*:
    - MOTION_TYPE_LINEAR - linear motion system,

- MOTION_TYPE_RADIAL - radial motion system
- *Default value*: MOTION_TYPE_LINEAR

- **user_dump_view3d_ySource** - Source of the Y-axis coordinates.
The value of the parameter is used to correctly draw the dump as a 3D model.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: Y_AXIS_SYSTEM_TIME
- *Max value*: Y_AXIS_MEASURES_COUNTER
- *Enum*:
  - Y_AXIS_SYSTEM_TIME - internal device timer,
  - Y_AXIS_STEP_COUNTER - parameter **user_trigger_counter_value**,
  - Y_AXIS_MEASURES_COUNTER - measurements counter
- *Default value*: Y_AXIS_SYSTEM_TIME

- **user_dump_view3d_yStep** - The value of a single step in the Y-axis.
- *Access*: read/write
- *Type*: double_t
- *Max value*: 10000
- *Default value*: 0.0005
- *Units*: mm

- **user_dump_view3d_paintMode** - 3D model coloring mode. This parameter is used when drawing a 3D model in the WEB-interface.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: PAINT_MODE_HEIGHTMAP
- *Max value*: PAINT_MODE_INTENSITY
- *Enum*:
  - PAINT_MODE_HEIGHTMAP - coloring according to the height map,
  - PAINT_MODE_INTENSITY - intensity mapping, parameter **user_streams_includeIntensity** must be set to TRUE,
- *Default value*: PAINT_MODE_HEIGHTMAP

- **user_dump_view3d_decimation** - Profiles decimation when drawing a 3D model. This parameter is used when drawing a 3D model in the WEB-interface.
- *Access*: read/write
- *Type*: uint32_t
- *Min value*: DUMP_VIEW3D_DECIM_1

- *Max value*: DUMP_VIEW3D_DECIM_200
- *Enum*:
  - DUMP_VIEW3D_DECIM_1 - all dump profiles are displayed,
  - DUMP_VIEW3D_DECIM_2 - step to display dump profiles 2,
  - DUMP_VIEW3D_DECIM_5 - step to display dump profiles 5,
  - DUMP_VIEW3D_DECIM_10 - step to display dump profiles 10,
  - DUMP_VIEW3D_DECIM_20 - step to display dump profiles 20,
  - DUMP_VIEW3D_DECIM_50 - step to display dump profiles 50,
  - DUMP_VIEW3D_DECIM_100 - step to display dump profiles 100,
  - DUMP_VIEW3D_DECIM_200 - step to display dump profiles 200,
- *Default value*: DUMP_VIEW3D_DECIM_1

- **user_eip_tcpPort** - The port number that the device listens for incoming TCP connections via EthernetIP.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Max value*: 65535
  - *Default value*: 44818

- **user_eip_udpPort** - The port number that the device listens for UDP packets with EthernetIP data.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Max value*: 65535
  - *Default value*: 2222

- **user_compatibility_rf625Enabled** - Enable or disable compatibility mode with the obsolete RF625 scanner. When enabling compatibility mode, UDP profile stream will be suspended.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Min value*: FALSE
  - *Max value*: TRUE
  - *Default value*: FALSE

- **user_compatibility_rf625TCPPort** - Port number for incoming TCP connections via RF625 protocol.
  - *Access*: read/write
  - *Type*: uint32_t
  - *Max value*: 65535
  - *Default value*: 620

Factory

- **fact_general_firmwareVer** - Device firmware version [Major, Minor, Patch].
  - *Access*: read
  - *Type*: u32_arr_t
  - *Max elements*: 3,
  - *Default value*: [1, 0, 0]

- **fact_general_hardwareVer** - Device hardware version.
  - *Access*: read
  - *Type*: uint32_t
  - *Default value*: 403051520

- **fact_general_deviceType** - Device type identifier.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 65535
  - *Default value*: 627

- **fact_general_serial** - Device serial number.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Default value*: 0

- **fact_general_pcbSerial** - Device PCB serial number.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Default value*: 0

- **fact_general_lifeTime** - Total device runtime in UNIX format.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 1577846300
  - *Default value*: 0
  - *Units*: s

- **fact_general_workTime** - Device uptime in UNIX format.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 1577846300
  - *Default value*: 0

    - *Units*: s

- **fact_general_startsCount** - Total number of device starts.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Max value*: 8760
    - *Default value*: 0
    - *Units*: times

- **fact_general_customerID** - Device customer identifier. The identifier of the company that purchased / ordered the device.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Default value*: 0
    - *Units*: id

- **fact_general_fpgaFreq** - FPGA project clock frequency for this device.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Min value*: 10000000
    - *Max value*: 500000000
    - *Default value*: 10000000
    - *Units*: Hz

- **fact_general_smr** - Start of measuring range in Z axis in mm.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Max value*: 10000
    - *Default value*: 80
    - *Units*: mm

- **fact_general_mr** - Size of the measuring range in Z axis in mm.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Max value*: 10000
    - *Default value*: 130
    - *Units*: mm

- **fact_general_xsmr** - The size along the X axis of the measuring range at the beginning of the range.
    - *Access*: read/awrite

- *Type*: uint32_t
- *Max value*: 10000
- *Default value*: 40
- *Units*: mm

- **fact_general_xemr** - The size along the X axis of the measuring range at the end of the range.
- *Access*: read/awrite
- *Type*: uint32_t
- *Max value*: 10000
- *Default value*: 40
- *Units*: mm

- **fact_general_pixDivider** - Divider to obtain the subpixel position of profile points in the uncalibrated data transfer mode (parameter **user_streams_format** is set to DATA_FORMAT_RAW_PROFILE).
- *Access*: read
- *Type*: uint32_t
- *Max value*: 65535
- *Default value*: 32

- **fact_general_profDivider** - Divider to obtain the subpixel position of profile points in the calibrated data transfer mode (parameter **user_streams_format** is set to DATA_FORMAT_PROFILE).
- *Access*: read
- *Type*: uint32_t
- *Max value*: 65535
- *Default value*: 16384

- **fact_general_oemDevName** - Device name assigned by the OEM customer.
- *Access*: read/awrite
- *Type*: string_t
- *Max len*: 128
- *Default value*: «Laser scanner»

- **fact_general_authStatus** - Authorization status for changing the factory settings of the device.
- *Access*: read
- *Type*: uint32_t
- *Min value*: AUTH_STATUS_USER

- *Max value*: AUTH_STATUS_FACTORY
- *Enum*:
    - AUTH_STATUS_USER - authorized as a user, factory settings cannot be changed,
    - AUTH_STATUS_FACTORY - authorized as a manufacturer, factory settings can be changed
- *Default value*: AUTH_STATUS_USER

- **fact_sensor_name** - Name of the sensor used in the device.
    - *Access*: read/awrite
    - *Type*: string_t
    - *Max len*: 64
    - *Default value*: «TYPE 1»

- **fact_sensor_width** - Number of pixels in the CMOS sensor.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Min value*: 648
    - *Max value*: 648
    - *Default value*: 648
    - *Units*: pixels

- **fact_sensor_height** - Number of lines in the CMOS sensor.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Min value*: 488
    - *Max value*: 488
    - *Default value*: 488
    - *Units*: lines

- **fact_sensor_pixFreq** - Pixel frequency for installed CMOS sensor.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Min value*: 1000000
    - *Max value*: 500000000
    - *Default value*: 40000000
    - *Units*: Hz

- **fact_sensor_frmConstPart** - Constant part of the frame cycle.
    - *Access*: read/awrite
    - *Type*: uint32_t
    - *Min value*: 200

- *Max value*: 200000
- *Default value*: 3500
- *Units*: ticks

- **fact_sensor_frmPerLinePart** - Frame cycle part for each line.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Min value*: 10
  - *Max value*: 100000
  - *Default value*: 160
  - *Units*: ticks

- **fact_sensor_minExposure** - Minimum allowable exposure value.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 100000000
  - *Step*: 10
  - *Default value*: 3000
  - *Units*: ns

- **fact_sensor_maxExposure** - Maximum allowable exposure value.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 300000000
  - *Step*: 10
  - *Default value*: 300000000
  - *Units*: ns

- **fact_sensor_imgFlip** - Image reflection mode. Applies directly to the image transmitted, by the CMOS sensor.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Min value*: FLIP_MODE_OFF
  - *Max value*: FLIP_MODE_XZ
  - *Enum*:
    - FLIP_MODE_OFF - no reflections,
    - FLIP_MODE_X - reflection along the X axis,
    - FLIP_MODE_Z - reflection along the Z axis,
    - FLIP_MODE_XZ - reflection along the X and Z axis
  - *Default value*: FLIP_MODE_OFF

- **fact_sensor_analogGain** - CMOS sensor analog gain value.
  - *Access*: read/awrite

- *Type*: uint32_t
- *Max value*: 7
- *Default value*: 5

- **fact_sensor_digitalGain** - CMOS sensor digital gain value.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 55
  - *Default value*: 48

- **fact_sensor_blackOdd** - Black level for odd lines.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 65535
  - *Default value*: 2300

- **fact_sensor_blackEven** - Black level for even lines.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 65535
  - *Default value*: 2400

- **fact_network_initRegs** - CMOS sensor registers values [regAddr, regValue …].
  - *Access*: read/awrite
  - *Type*: u32_arr_t
  - *Max value*: 255
  - *Max elements*: 64,
  - *Default value*: [41, 1, 83, 155, 58, 20, 59, 0, 60, 11, 69, 9, 80, 4, 97, 0, 98, 12, 101, 98, 102, 34, 103, 64, 106, 90, 107, 110, 108, 91, 109, 82, 110, 80, 117, 91]

- **fact_network_macAddr** - Physical address of the device.
  - *Access*: read/awrite
  - *Type*: u32_arr_t
  - *Max value*: 255
  - *Max elements*: 6,
  - *Default value*: [0x00, 0x0A, 0x35, 0x01, 0x02, 0x03]

- **fact_network_forceAutoNegTime** - The time after which the auto-negotiation of the Ethernet connection will be forced if the connection is not established.

- *Access*: read/awrite
- *Type*: uint32_t
- *Max value*: 255
- *Default value*: 5
- *Units*: s

- **fact_network_webSockServicePort** - Port number for the service data transmission WEB-socket. Used by the Web-page.
- *Access*: read/awrite
- *Type*: uint32_t
- *Min value*: 16384
- *Max value*: 65535
- *Default value*: 50002

- **fact_network_webSockDataPort** - Port number for the large data transmission WEB-socket. Used by the Web-page.
- *Access*: read/awrite
- *Type*: uint32_t
- *Min value*: 16384
- *Max value*: 65535
- *Default value*: 50003

- **fact_network_webSockMathPort** - Port number for the math data transmission WEB-socket. Used by the Web-page.
- *Access*: read/awrite
- *Type*: uint32_t
- *Min value*: 16384
- *Max value*: 65535
- *Default value*: 50004

- **fact_laser_waveLength** - The wavelength of the laser, installed in the device.
- *Access*: read/awrite
- *Type*: uint32_t
- *Max value*: 10000
- *Default value*: 650
- *Units*: nm

- **fact_laser_minValue** - Minimum DAC value. At this value, the laser stops emitting light.
- *Access*: read/awrite
- *Type*: uint32_t
- *Max value*: 4095

- *Default value*: 0

- **fact_laser_maxValue** - Maximum DAC value. At this value, the laser starts to emit light with maximum power.
  - *Access*: read/awrite
  - *Type*: uint32_t
  - *Max value*: 4095
  - *Default value*: 4095

- **fact_eip_identity_vendorID** - Identification number for the manufacturer of an EtherNet/IP device.
  - *Access*: read
  - *Type*: uint32_t
  - *Default value*: 1588

- **fact_eip_identity_deviceType** - The list of device types is managed by ODVA and CI. It is used to identify the device profile that a particular product is using.
  - *Access*: read
  - *Type*: uint32_t
  - *Max value*: 65535
  - *Default value*: 0x2B

- **fact_eip_identity_productCode** - Product identifier according to developer documentation.
  - *Access*: read
  - *Type*: uint32_t
  - *Default value*: 627

- **fact_eip_identity_rev** - The Revision attribute, which consists of major and minor revisions, identifies the revision of the item the Identity Object is representing.
  - *Access*: read
  - *Type*: u32_arr_t
  - *Max value*: 255
  - *Max elements*: 2,
  - *Default value*: [1, 0]

- **fact_eip_identity_status** - Represents the current status of the entire device. Its value changes as the state of the device changes.
  - *Access*: read

- *Type*: uint32_t
- *Enum*:
    - Owned - the device (or an object within the device) has an owner,
    - Configured - the application of the device has been configured to do something different than the “out–of–box” default,
    - Minor Recoverable Fault - the device detected a problem with itself, which is thought to be recoverable. The problem does not cause the device to go into one of the faulted states,
    - Minor Unrecoverable Fault- the device detected a problem with itself, which is thought to be unrecoverable. The problem does not cause the device to go into one of the faulted states,
    - Major Recoverable Fault - the device detected a problem with itself, which caused the device to go into the “Major Recoverable Fault” state,
    - Major Unrecoverable Fault - the device detected a problem with itself, which caused the device to go into the “Major Unrecoverable Fault” state
- *Default value*: 0

- **fact_eip_tcpIntrf_status** - is a bitmap that shall indicate the status of the TCP/IP network interface.
- *Access*: read
- *Type*: uint32_t
- *Enum*:
    - No configured - The Interface Configuration attribute has not been configured,
    - Configured - The Interface Configuration attribute contains configuration obtained from BOOTP, DHCP or nonvolatile storage,
    - Hardware Configured - The IP address member of the Interface Configuration attribute contains configuration, obtained from hardware settings,
    - Mcast Pending - Indicates a pending configuration change in the TTL Value and/or Mcast Config attributes,
    - Interface Configuration Pending - Indicates a pending configuration change in the Interface Configuration attribute,
    - Address Conflict Detection Status - Indicates when an IP address conflict has been detected by ACD
- *Default value*: 0

- **fact_eip_tcpIntrf_capability** - is a bitmap that indicates the device’s support for optional network configuration capability.
- *Access*: read
- *Type*: uint32_t

- *Enum*:
    - BOOTP Client - the device is capable of obtaining its network configuration via BOOTP,
    - DNS Client - the device is capable of resolving host names by querying a DNS server,
    - DHCP Client - the device is capable of obtaining its network configuration via DHCP,
    - Configuration Settable - the Interface Configuration attribute is settable,
    - Hardware Configurable - the IP Address member of the Interface Configuration attribute can be obtained from hardware settings (e.g., pushwheel, thumbwheel, etc.),
    - Interface Configuration Change Requires Reset - the device requires a restart in order for a change to the Interface Configuration attribute to take effect,
    - Address Conflict Detection Capable - the device is capable of ACD
- *Default value*: 0x14

- **fact_eip_tcpIntrf_control** - is a bitmap used to control network configuration options.
- *Access*: read
- *Type*: uint32_t
- *Enum*:
    - Static ip mode - The device shall use statically-assigned IP configuration values,
    - BOOTP mode - The device shall obtain its interface configuration values via BOOTP,
    - DHCP mode - The device shall obtain its interface configuration values via DHCP
    - DNS Enable - the device shall resolve host names by querying a DNS server
- *Default value*: 0

- **fact_eip_tcpIntrf_phyLink** - identifies the object associated with the underlying physical communications interface (e.g., an 802.3 interface).
- *Access*: read
- *Type*: u32_arr_t
- *Max value*: 255
- *Max elements*: 6
- *Default value*: [0x20, 0xF6, 0x24, 0x01]

- **fact_eip_tcpIntrf_inactTimeout** - is used to enable TCP socket

cleanup (closing) when the defined number of seconds have elapsed
with no Encapsulation activity.
- *Access*: read/awrite
- *Type*: uint32_t
- *Max value*: 255
- *Default value*: 120

- **fact_smart_enabled** - Turn on and off the capabilities of a
smart device.
- *Access*: read/awrite
- *Type*: uint32_t
- *Min value*: FALSE
- *Max value*: TRUE
- *Default value*: FALSE

1.4.2 WEB API v1

Using the easy-to-use WEB API, the user can get information about the device, read or write the value of the parameter. Also, through the WEB API, the device can execute some commands. A complete list of commands supported through this access is given in the description of the commands. The WEB API examples use the factory IP address of the device and presented as they should be typed in the address bar of the browser. If it has been changed by the user, the IP address of the device should be used.

Quick device info

- **/hello** - Getting general information about the device in JSON
format.
- *GET*:
    - 192.168.1.30/hello

- **/api/v1/config/commands** - Getting the list of commands, supported
by the device. The formalized description will contain the command
name, WEB API access capability, command identifier and access mode.
- *GET*:
    - 192.168.1.30/api/v1/config/commands

- **/api/v1/config/returnCodes** - Getting a text description of the
codes of operation results and errors, returned by the device.
- *GET*:
    - 192.168.1.30/api/v1/config/returnCodes

Device parameters

- **/api/v1/config/params** - Getting general information about all device parameters in JSON format. The formalized description of the parameter will contain its name, type, access mode, index in the parameter array, offset for binary data, parameter data size, current value, default value, minimum and maximum values, parameter value step, for arrays - the maximum number of elements.
  - *GET*:
    - 192.168.1.30/api/v1/config/params

- **/api/v1/config/params/values** - Reading and writing values of the device parameters. For reading it is possible to request specific parameters by name or index. To write a parameter, it is necessary to form a «PUT» request with the parameters «parameter_name:value».
  - *GET*:
    - 192.168.1.30/api/v1/config/params/values
    - 192.168.1.30/api/v1/config/params/values?name=fact_general_hardwareVer&index=120
  - *PUT*:
    - 192.168.1.30/api/v1/config/params/values?user_sensor_framerate=100&user_sensor_exposure1=1

- **/api/v1/sensor** - Reading and writing CMOS-sensor registers.
  - *GET*:
    - 192.168.1.30/api/v1/sensor?reg=0x5B&val=0x003F
    - 192.168.1.30/api/v1/sensor?index=0&reg=0x5B&val=0x003F
  - *PUT*:
    - 192.168.1.30/api/v1/sensor?reg=0x5B&val=0x003F
    - 192.168.1.30/api/v1/sensor?index=0&reg=0x5B&val=0x003F

Save, restore and reboot

- **/api/v1/config/params/save** - Saving the current values of the device parameters in non-volatile memory in user area. Saved values will be used when the device is switched on again.
  - *GET*:
    - 192.168.1.30/api/v1/config/params/save

- **/api/v1/config/params/restore/save** - Saving the current values of the device parameters in the recovery area. These parameters will be applied when parameters from the user area are damaged.
  - *GET*:
    - 192.168.1.30/api/v1/config/params/restore/save

- **/api/v1/config/params/restore/load** - Loading device parameter values from the recovery area. The loaded values will be written to the user area, the device will be automatically rebooted.
  - *GET*:
    - 192.168.1.30/api/v1/config/params/restore/load

- **/api/v1/reboot** - Reboot the device. The parameters will be loaded from the user area (if they are not damaged).
  - *GET*:
    - 192.168.1.30/api/v1/reboot

Log

- **/api/v1/log** - Getting a log of the device with full description of records.
  - *GET*:
    - 192.168.1.30/api/v1/log

- **/api/v1/log/content** - Getting the device log in an abbreviated form - is easier to read.
  - *GET*:
    - 192.168.1.30/api/v1/log/content

Authorization

- **/api/v1/authorization** - Authorization on the device as a manufacturer - allows editing factory parameters of the device. Using the «GET» request, get a token for which generate a key and send to the device in the «PUT» request.
  - *GET*:
    - 192.168.1.30/api/v1/authorization
  - *PUT*:
    - 192.168.1.30/api/v1/authorization?key=230d84e16c0dae529098f1f1bb…..

1.4.3 COMMANDS

The commands transmitted to the device are intended for searching devices in the network, reading and setting parameters, downloading service data, firmware upgrade, receiving frames generated by CMOS-sensor and other functions. The commands and their answers are given in the service protocol (in the current revision, RF627 protocol). The service protocol uses UDP packets sent to the device's network address (parameter **user_network_ip**) and the service port (parameter **user_network_servicePort**).

General device commands

- **HELLO_JSON_REQUEST** - Search for devices on the network. In answer to the command, JSON will be sent with a description of the main parameters of the device.
  - *URI*: /hello
  - *CID*: 0x0010
  - *Access*: unlocked
  - *Command payload*: no
  - *Answer payload*: JSON

- **PARAMS_DESCRIPTION_REQUEST** - Getting general information about all device parameters in JSON format. The formalized description of the parameter will contain its name, type, access mode, index in the parameter array, offset for binary data, parameter data size, current value, default value, minimum and maximum values, parameter value step, for arrays - the maximum number of elements.
  - *URI*: /api/v1/config/params
  - *CID*: 0x0110
  - *Access*: unlocked
  - *Command payload*: no
  - *Answer payload*: JSON

- **COMMANDS_DESCRIPTION_REQUEST** - Getting the list of commands, supported by the device. The formalized description will contain the command name, WEB API access capability, command identifier and access mode.
  - *URI*: /api/v1/config/commands
  - *CID*: 0x0210
  - *Access*: unlocked
  - *Command payload*: no
  - *Answer payload*: JSON

- **PARAMS_VALUES_JSON_REQUEST** - Reading values of the device parameters. For reading it is possible to request specific parameters by name or index.
  - *URI*: /api/v1/config/params/values
  - *CID*: 0x0310
  - *Access*: unlocked
  - *Command payload*: JSON [name:XXXX, name:XXXX, index:XXXX…]
  - *Answer payload*: JSON [name:value, name:value, name:value…]

- **PARAMS_VALUES_JSON_WRITE** - Writing values of the device

parameters, it is necessary to send the parameters in form of pair «parameter_name:value».
- *CID*: 0x1010
- *Access*: unlocked
- *Command payload*: JSON [name:value, name:value, index:value…]
- *Answer payload*: JSON [name:OK, name:OK, name:OK…]

- **PARAMS_VALUES_BIN_REQUEST** - Reading parameter values in binary form. Each parameter will be stacked according to its index and size.
- *CID*: 0x0410
- *Access*: unlocked
- *Command payload*: no
- *Answer payload*: BIN

- **RETURN_CODES_JSON_REQUEST** - Getting a text description of the codes of operation results and errors, returned by the device.
- *URI*: /api/v1/config/returnCodes
- *CID*: 0x2010
- *Access*: unlocked
- *Command payload*: no
- *Answer payload*: JSON

- **PARAMS_SAVE** - Saving the current values of the device parameters in non-volatile memory in user area. Saved values will be used when the device is switched on again.
- *URI*: /api/v1/config/params/save
- *CID*: 0x0510
- *Access*: unlocked
- *Command payload*: no
- *Answer payload*: JSON [result:OK]

- **PARAMS_RESTORE_SAVE** - Saving the current values of the device parameters in the recovery area. These parameters will be applied when parameters from the user area are damaged.
- *URI*: /api/v1/config/params/restore/save
- *CID*: 0x0610
- *Access*: unlocked
- *Command payload*: no
- *Answer payload*: JSON [result:OK]

- **PARAMS_RESTORE_LOAD** - Loading device parameter values from the recovery area. The loaded values will be written to the user area, the device will be automatically rebooted.

- *URI*: /api/v1/config/params/restore/load
- *CID*: 0x0710
- *Access*: unlocked
- *Command payload*: no
- *Answer payload*: JSON [result:OK]

- **AUTHORIZATION_REQUEST** - Authorization on the device as a manufacturer - allows editing factory parameters of the device.
  - *URI*: /api/v1/authorization
  - *CID*: 0x2110
  - *Access*: unlocked
  - *Command payload*: no/key
  - *Answer payload*: JSON

Calibration file

- **CALIB_FILE_DATA_WRITE** - Writing a fragment of a calibration file into a device.
  - *CID*: 0x1052
  - *Access*: unlocked
  - *Command payload*: BIN (uint32_t: offset; uint8_t: data[])
  - *Answer payload*: no

- **CALIB_FILE_CRC16_REQUEST** - Getting the checksum of the calibration file, uploaded to the device.
  - *CID*: 0x1252
  - *Access*: unlocked
  - *Command payload*: no
  - *Answer payload*: BIN (uint16_t: CRC)

- **CALIB_FILE_SAVE** - Saving the calibration file in a non-volatile memory of the device.
  - *CID*: 0x2052
  - *Access*: unlocked
  - *Command payload*: no
  - *Answer payload*: no

Profiles request

- **PROFILE_CAPTURE** - Command to start measurement. It is used only in the software measurement start mode (parameter **user_sensor_syncSource** = SYNC_SOFTWARE). When the command is received, the device starts the cycle of measurement, after that, the profile is calculated and a standard package with the profile is sent.
  - *CID*: 0x0459
  - *Access*: unlocked
  - *Command payload*: BIN (uint32_t: count (max: 16777215))
  - *Answer payload*: no

- **PROFILE_REQUEST** - The command to read the last calculated profile. The profile will be transferred in the payload of the service protocol message.
  - *CID*: 0x0559
  - *Access*: unlocked
  - *Command payload*: no
  - *Answer payload*: BIN

Dump request

- **DUMP_CONTENT_REQUEST** - Request the contents of the profile dump.
  - *CID*: 0x2259
  - *Access*: unlocked
  - *Command payload*: BIN (uint32_t: index; uint32_t: count)
  - *Answer payload*: BIN

Frame request

- **FRAME_REQUEST** - Request one frame of the image, exposed by the CMOS sensor.
  - *CID*: 0x1083
  - *Access*: unlocked
  - *Command payload*: BIN (uint32_t: index; uint32_t: count)
  - *Answer payload*: BIN (uint32_t: offset; uint8_t: data[])

Log request

- **LOG_PART_REQUEST** - Request a part of the device log file with a full description of the entries.
  - *URI*: /api/v1/log
  - *CID*: 0x0357
  - *Access*: unlocked
  - *Command payload*: JSON {index: XXX, count: XXX}
  - *Answer payload*: JSON

- **LOG_CONTENT_REQUEST** - Request the device log in an abbreviated form - is easier to read.
  - *URI*: /api/v1/log/content
  - *CID*: 0x0457
  - *Access*: unlocked
  - *Command payload*: no
  - *Answer payload*: JSON

Internal non-volatile memory

- **FLASH_ERASE** - Cleaning of the internal non-volatile memory of the device (execution of the command may lead to inoperability of the device). The command arguments are the start address of the erase area and the size of the erase area. The address must be aligned to 65536 bytes and the size is a multiple of 65536 bytes.
  - *CID*: 0x005A
  - *Access*: locked
  - *Command payload*: BIN (uint32_t: addr; uint32_t: size}
  - *Answer payload*: no

- **FLASH_FIRMWARE_READ** - Reading the firmware of the device.
  - *CID*: 0x1A5A
  - *Access*: unlocked
  - *Command payload*: no
  - *Answer payload*: BIN (uint32_t: offset; uint8_t: data[])

- **FLASH_FIRMWARE_WRITE** - Write device firmware.
  - *CID*: 0x205A
  - *Access*: unlocked
  - *Command payload*: BIN (uint32_t: offset; uint8_t: data[])
  - *Answer payload*: no

- **FLASH_FIRMWARE_CRC16_REQUEST** - Request the checksum of the

firmware that has been uploaded to the device. The request must be made before writing the firmware to the internal non-volatile memory of the device.
- *CID*: 0x215A
- *Access*: unlocked
- *Command payload*: no
- *Answer payload*: BIN (uint16_t: CRC)

- **FLASH_FIRMWARE_SAVE** - Saving the loaded firmware to the internal non-volatile memory of the device. A checksum (command **FLASH_FIRMWARE_CRC16_REQUEST**) must be requested before saving.
- *CID*: 0x225A
- *Access*: unlocked
- *Command payload*: no
- *Answer payload*: no

Device to Web-page notification

- **FLASH_FIRMWARE_SAVE** - With this command, the device notifies the Web-page of various internal events: status changes, warnings, errors.
- *CID*: 0x1063
- *Access*: locked
- *Command payload*: JSON {time: XXX, type: (NTF_INFO/NTF_WARN/NTF_ERR), message: TEXT}
- *Answer payload*: no

Periphery commands

- **PERIPHERY_TRANSFER** - Transfer of data to and from connected peripheral devices.
- *CID*: 0x1080
- *Access*: unlocked
- *Command payload*: BIN
- *Answer payload*: BIN

ГЛАВА 2

Описания API

2.1 API «ядра» на C

RF62X-CORE - основная библиотека («Ядро») с базовым набором функций и типов для работы с лазерными сканерами серии RF62X. Библиотека написана на языке программирования СИ в соответствии со стандартом C99 (ISO / IEC 9899: 1999) и является кросс-платформенной. Для использования данной библиотеки необходима реализация платформозависимых функций (работа с памятью, работа с сетью, функции ввода/вывода).

Для скачивания библиотеки см. *последние выпуски «ядра» на C*.
Для компиляции библиотеки см. *компиляция и запуск «ядра» на C*.

2.1.1 Инициализация «ядра»

При желании использовать библиотеку RF62X-CORE вместо предоставляемых библиотек-«обёрток» разработчику необходимо самостоятельно реализовать платформозависимую часть «ядра» (см. *компиляция и запуск «ядра»*).

Файл `rf62X_core.h` является заголовочным файлом с описанием функций для запуска «ядра». Этот файл содержит определения основных функций, используемых при его инициализации:

init_platform_dependent_methods()

Функция инициализация платформозависимой части «ядра»

void **init_platform_dependent_methods**(*memory_platform_dependent_methods_t *memory_methods*, *iostream_platform_dependent_methods_t *iostream_methods*, *network_platform_dependent_methods_t *network_methods*, *network_platform_dependent_settings_t *adapter_settings*)

init_platform_dependent_methods - Init platform dependent methods and settings

Parameters

- `memory_methods`: Structure with platform-specific methods for work with memory
- `iostream_methods`: Structure with platform-specific methods for work with iostream
- `network_methods`: Structure with platform-specific methods for work with network
- `adapter_settings`: Structure with platform-specific settings

core_version()

Функция для получения текущей версии «ядра»:

rfChar ***core_version**()

core_version - Return rf627 sdk version.

Return ptr to rfChar

2.1.2 Обзор программного интерфейса

Файл `rf62X_sdk.h` является основным файлом программного интерфейса (API) «ядра» и определяет его функциональность. `rf62X_sdk.h` содержит следующий набор базовых функций для разработки:

set_platform_adapter_settings()

Функция для передачи текущих настроек адаптера в ядро. Данная функция используется в том случае, если произошли какие-либо изменения настроек в используемом ядром сетевом адаптаре.

void **set_platform_adapter_settings**(rfUint32 *subnet_mask*, rfUint32 *host_ip_addr*)

change_platform_adapter_settings - change adapter's settings

Parameters

- `[in] subnet_mask`: Subnet mask on your local machine. A subnet mask is a number that defines a range of IP addresses that can be used in a network.

- `[in] host_ip_addr`: IP address of your network adapter(card)

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));

//Initialization vector
vector_init(&scanners);


// Iterate over all available network adapters in the current operating
// system to send "Hello" requests.
for (int i=0; i<GetAdaptersCount(); i++)
{
   // get another IP Addr and set this changes in network adapter settings.
   uint32_t host_ip_addr = ntohl(inet_addr(GetAdapterAddress(i)));
   uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
   // call the function to change adapter settings inside the library.
   set_platform_adapter_settings(host_mask, host_ip_addr);

   // Search for RF627Old devices over network by Service Protocol.
   search_scanners(scanners, kRF627_OLD, kSERVICE);
}
```

search_scanners()

Функция для поиска устройств RF62X по сети

rfUint8 **search_scanners**(vector_t **list*, scanner_types_t *model*, protocol_types_t *protocol*)

search - Search for RF62X devices over network

Return 0 on success

Parameters

- `list`: - ptr to list of rf627 objects. If not null list will be filled with found devices
- `model`: - scanner's type (RF627-old, RF627-smart)
- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));
//Initialization vector
vector_init(&scanners);

// set IP Addr and NetMask for setting in network adapter settings.
uint32_t host_ip_addr = ntohl(inet_addr("192.168.1.2"));
uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
// call the function to change adapter settings inside the library.
set_platform_adapter_settings(host_mask, host_ip_addr);

// Search for RF627Old devices over network by Service Protocol.
search_scanners(scanners, kRF627_OLD, kSERVICE);
```

get_info_about_scanner()

Функция для получения информации о сканере из пакета приветствия (Hello-пакет)

hello_information **get_info_about_scanner**(scanner_base_t **device*, protocol_types_t *protocol*)

get_hello_info_of_scanners - Get information about scanner from hello packet

Return 0 on success

Parameters

- `device`: - prt to scanner
- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));
//Initialization vector
vector_init(&scanners);

// set IP Addr and NetMask for setting in network adapter settings.
uint32_t host_ip_addr = ntohl(inet_addr("192.168.1.2"));
uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
// call the function to change adapter settings inside the library.
set_platform_adapter_settings(host_mask, host_ip_addr);

// Search for RF627Old devices over network by Service Protocol.
search_scanners(scanners, kRF627_OLD, kSERVICE);

// Iterate over all discovered RF627Old in network and get info.
for(size_t i = 0; i < vector_count(scanners); i++)
   hello_information info = get_info_about_scanner(
                                (scanner_base_t*)vector_get(scanners,i),␣
↪kSERVICE);
```

connect_to_scanner()

Функция для установки соединения со сканером серии RF62X

rfUint8 **connect_to_scanner**(scanner_base_t **device*, protocol_types_t *protocol*)

connect - Establish connection to the RF62X device

Return 0 on success

Parameters

- `device`: - prt to scanner
- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));
//Initialization vector
vector_init(&scanners);

// set IP Addr and NetMask for setting in network adapter settings.
uint32_t host_ip_addr = ntohl(inet_addr("192.168.1.2"));
uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
// call the function to change adapter settings inside the library.
set_platform_adapter_settings(host_mask, host_ip_addr);

// Search for RF627Old devices over network by Service Protocol.
search_scanners(scanners, kRF627_OLD, kSERVICE);

// Iterate over all discovered RF627Old in network and Establish connection.
for(size_t i = 0; i < vector_count(scanners); i++)
   connect_to_scanner((scanner_base_t*)vector_get(scanners,i), kSERVICE);
```

disconnect_from_scanner()

Функция для закрытия ранее установленного соединения со сканером серии RF62X

rfUint8 **disconnect_from_scanner**(scanner_base_t **device*, protocol_types_t *protocol*)

disconnect_from_scanner - Close connection to the device

Return 0 on success

Parameters

- `device`: - prt to scanner
- `protocol`: - protocol's type (Service, ENIP, Modbus-TCP)

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));
//Initialization vector
vector_init(&scanners);

// set IP Addr and NetMask for setting in network adapter settings.
uint32_t host_ip_addr = ntohl(inet_addr("192.168.1.2"));
uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
// call the function to change adapter settings inside the library.
set_platform_adapter_settings(host_mask, host_ip_addr);

// Search for RF627Old devices over network by Service Protocol.
search_scanners(scanners, kRF627_OLD, kSERVICE);

// Iterate over all discovered RF627Old in network and Establish connection.
for(size_t i = 0; i < vector_count(scanners); i++)
   connect_to_scanner((scanner_base_t*)vector_get(scanners,i), kSERVICE);

// Iterate over all discovered RF627Old in network for Disabling connection.
for(size_t i = 0; i < vector_count(scanners); i++)
   disconnect_from_scanner((scanner_base_t*)vector_get(scanners,i), kSERVICE);
```

get_profile2D_from_scanner()

Функция для получения профиля со сканеров серии RF62X

rf627_profile2D_t *__get_profile2D_from_scanner__(scanner_base_t *device*, rfBool *zero_points*, protocol_types_t *protocol*)

get_profile - Get measurement from scanner's data stream

Return ptr to rf627_profile_t structure

Parameters

- `device`: - ptr to scanner
- `zero_points`: - include zero points in return profile2D
- `protocol`: - protocol's type (Service, ENIP, Modbus-TCP)

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));
//Initialization vector
vector_init(&scanners);

// set IP Addr and NetMask for setting in network adapter settings.
uint32_t host_ip_addr = ntohl(inet_addr("192.168.1.2"));
uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
// call the function to change adapter settings inside the library.
set_platform_adapter_settings(host_mask, host_ip_addr);

// Search for RF627Old devices over network by Service Protocol.
search_scanners(scanners, kRF627_OLD, kSERVICE);

// Iterate over all discovered RF627Old in network and Establish connection.
for(size_t i = 0; i < vector_count(scanners); i++)
{
   scanner_base_t* scanner = vector_get(scanners,i);
   connect_to_scanner(scanner, kSERVICE);

   // Flag for included zero points in return profile2D
   bool zero_points = true;
   // Get profile from scanner's data stream by Service Protocol.
   rf627_profile2D_t* profile = get_profile2D_from_scanner(scanner, zero_
↪points, kSERVICE);

   {
      // some actions with profile
   }

   disconnect_from_scanner(scanner, kSERVICE);

   // Freeing memory after using profile structure
   free(profile->rf627_profile2D->intensity);
   free(profile->rf627_profile2D->pixels_format.pixels);
   free(profile->rf627_profile2D);
   free(profile);
}
```

read_params_from_scanner()

Функция получения текущих параметров сканера. При вызове данной функции «ядро» вычитывает со сканера все актуальные параметры, сохраняя их ввиде «списка параметров» для дальнейшей работы.

rfUint8 **read_params_from_scanner**(scanner_base_t **device*, protocol_types_t *protocol*)

read_params_from_scanner - Read parameters from device to rfInternal structure. This structure is accessible via get_params() function

Return 0 on success

Parameters

- `device`: - ptr to scanner
- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));
//Initialization vector
vector_init(&scanners);

// set IP Addr and NetMask for setting in network adapter settings.
uint32_t host_ip_addr = ntohl(inet_addr("192.168.1.2"));
uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
// call the function to change adapter settings inside the library.
set_platform_adapter_settings(host_mask, host_ip_addr);

// Search for RF627Old devices over network by Service Protocol.
search_scanners(scanners, kRF627_OLD, kSERVICE);

// Iterate over all discovered RF627Old in network and Establish connection.
for(size_t i = 0; i < vector_count(scanners); i++)
{
   scanner_base_t* scanner = vector_get(scanners,i);
   connect_to_scanner(scanner, kSERVICE);

   // Read parameters from device to the internal structure of the core
   read_params_from_scanner(scanner, kSERVICE);

   {
      // some actions with params
   }

   disconnect_from_scanner(scanner, kSERVICE);
}
```

get_parameter()

Функция получения конкретного параметра по его имени (ключу). При вызове данной функции «ядро» осуществляет поиск нужного параметра из последних прочитанных при вызове функции read_params_from_scanner. В случае, если запрашиваемый параметр отсутствует в конкретном сканере, функция вернёт null.

parameter_t ***get_parameter**(scanner_base_t **device*, **const** rfChar **param_name*)

get_parameter - Search parameters by his name

Return param on success, else - null

Parameters

- `device`: - ptr to scanner
- `param_name`: - name of parameter

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));
//Initialization vector
vector_init(&scanners);

// set IP Addr and NetMask for setting in network adapter settings.
uint32_t host_ip_addr = ntohl(inet_addr("192.168.1.2"));
uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
// call the function to change adapter settings inside the library.
set_platform_adapter_settings(host_mask, host_ip_addr);

// Search for RF627Old devices over network by Service Protocol.
search_scanners(scanners, kRF627_OLD, kSERVICE);

// Iterate over all discovered RF627Old in network and Establish connection.
for(size_t i = 0; i < vector_count(scanners); i++)
{
   scanner_base_t* scanner = vector_get(scanners,i);
   connect_to_scanner(scanner, kSERVICE);

   // Read parameters from device to the internal structure of the core
   read_params_from_scanner(scanner, kSERVICE);

   // Get parameter of Device Name
   parameter_t* name = get_parameter(scanner, "user_general_deviceName");
   if ((name != NULL) && (strcmp(name->type, "string_t")==0)
   {
      char* str_name = name->val_str->value;
      printf("Current Device Name: %s\n", str_name);
   }

   disconnect_from_scanner(scanner, kSERVICE);
}
```

Для более удобной работы с параметрами можно использовать соответствующие «ключи» (ключ имени параметра, тип параметра и доступ к параметру). Для этого в файле `rt62X_types.h` находятся следующие `enum`:

enum paramValueType_t

Values:

PVT_UNKN = 0

PVT_UINT

PVT_UINT64

PVT_INT

PVT_INT64

PVT_FLOAT

PVT_DOUBLE

PVT_ARRAY_UINT32

PVT_ARRAY_UINT64

PVT_ARRAY_INT32

PVT_ARRAY_INT64

PVT_ARRAY_FLT

PVT_ARRAY_DBL

PVT_STRING

PVT_UNKN = 0

PVT_UINT

PVT_UINT64

PVT_INT

PVT_INT64

PVT_FLOAT

PVT_DOUBLE

PVT_ARRAY_UINT32

PVT_ARRAY_UINT64

PVT_ARRAY_INT32

PVT_ARRAY_INT64

PVT_ARRAY_FLT

PVT_ARRAY_DBL

PVT_STRING

enum paramAccessType_t

Values:

PAT_UNKN = 0

PAT_READ_ONLY

PAT_WRITE

PAT_LOCKED

PAT_UNKN = 0

PAT_READ_ONLY

PAT_WRITE

PAT_LOCKED

enum parameter_name_keys_t

Values:

FACT_GENERAL_PROTOCOLREV = 0

FACT_GENERAL_DEVICETYPE

FACT_GENERAL_SERIAL

FACT_GENERAL_PCBSERIAL

FACT_GENERAL_LIFETIME

FACT_GENERAL_WORKTIME

FACT_GENERAL_STARTSCOUNT

FACT_GENERAL_FIRMWAREREV

FACT_GENERAL_HARDWAREREV

FACT_GENERAL_FSBLREV

FACT_GENERAL_CUSTOMERID

FACT_GENERAL_FPGAFREQ

FACT_GENERAL_SMR

FACT_GENERAL_MR

FACT_GENERAL_XSMR

FACT_GENERAL_XEMR

FACT_GENERAL_PIXDIVIDER

FACT_GENERAL_PROFDIVIDER

FACT_GENERAL_OEMDEVNAME

FACT_GENERAL_AUTHSTATUS

FACT_SENSOR_NAME

FACT_SENSOR_WIDTH

FACT_SENSOR_HEIGHT

FACT_SENSOR_PIXFREQ

FACT_SENSOR_FRMCONSTPART

FACT_SENSOR_FRMPERLINEPART

FACT_SENSOR_FPSOREXP

FACT_SENSOR_MINEXPOSURE

FACT_SENSOR_MAXEXPOSURE

FACT_SENSOR_IMGFLIP

FACT_NETWORK_MACADDR

FACT_NETWORK_FORCEAUTONEGTIME

FACT_NETWORK_WEBSOCKSERVICEPORT

FACT_NETWORK_WEBSOCKDATAPORT

FACT_NETWORK_WEBSOCKMATHPORT

FACT_LASER_WAVELENGTH

FACT_LASER_KOEFF1

FACT_LASER_KOEFF2

FACT_LASER_MINVALUE

FACT_LASER_MAXVALUE

FACT_PROFILES_MAXDUMPSIZE

FACT_EIP_IDENTITY_VENDORID

FACT_EIP_IDENTITY_DEVICETYPE

FACT_EIP_IDENTITY_PRODUCTCODE

FACT_EIP_IDENTITY_REV

FACT_EIP_TCPINTRF_CAPABILITY

FACT_EIP_TCPINTRF_PHY_PATHSIZE

FACT_EIP_TCPINTRF_PHY_CLASSID

FACT_EIP_TCPINTRF_PHY_INSTNUMBER

FACT_EIP_TCPINTRF_PHY_ATTRNUMBER

FACT_EIP_INTRFTYPE

FACT_EIP_INTRFCAPABILITY_BITS

FACT_EIP_INTRFCAPABILITY_SPEEDDUPCOUNT

FACT_EIP_INTRFCAPABILITY_SPEEDDUPLEX_SPEED

FACT_EIP_INTRFCAPABILITY_SPEEDDUPLEX_DUPLEX

FACT_SENSOR_ANALOGGAIN

FACT_SENSOR_DIGITALGAIN

FACT_SENSOR_BLACKODD

FACT_SENSOR_BLACKEVEN

FACT_SENSOR_HDRPIECEWISEDIV1

FACT_SENSOR_HDRPIECEWISEDIV2

FACT_SENSOR_INITREGS

USER_GENERAL_DEVICESTATE

USER_GENERAL_DEVICENAME

USER_GENERAL_SAVELOG

USER_SYSMON_FPGATEMP

USER_SYSMON_PARAMSCHANGED

USER_SYSMON_TEMPSENS00

USER_SYSMON_TEMPSENS00MAX

USER_SYSMON_TEMPSENS00MIN

USER_SYSMON_TEMPSENS01

USER_SYSMON_TEMPSENS01MAX

USER_SYSMON_TEMPSENS01MIN

USER_SYSMON_TEMPSENS10

USER_SYSMON_TEMPSENS10MAX

USER_SYSMON_TEMPSENS10MIN

USER_SYSMON_TEMPSENS11

USER_SYSMON_TEMPSENS11MAX

USER_SYSMON_TEMPSENS11MIN

USER_SENSOR_SYNCSOURCE

USER_SENSOR_FRAMERATE

USER_SENSOR_MAXFRAMERATE

USER_SENSOR_EXPOSURECONTROL

USER_SENSOR_EXPOSURE1

USER_SENSOR_EXPOSURE2

USER_SENSOR_EXPOSURE3

USER_SENSOR_EXPOSURE4

USER_SENSOR_MAXEXPOSURE

USER_ROI_ENABLED

USER_ROI_ACTIVE

USER_ROI_POSMODE

USER_ROI_POS

USER_ROI_MAXPOS

USER_ROI_REQPROFSIZE

USER_NETWORK_SPEED

USER_NETWORK_REQUIREDSPEED

USER_NETWORK_AUTONEG

USER_NETWORK_IP

USER_NETWORK_MASK

USER_NETWORK_GATEWAY

USER_NETWORK_HOSTIP

USER_NETWORK_HOSTPORT

USER_NETWORK_WEBPORT

USER_NETWORK_SERVICEPORT

USER_STREAMS_UDPENABLED

USER_STREAMS_FORMAT

USER_STREAMS_INCLUDEINTENSITY

USER_PROCESSING_THRESHOLD

USER_PROCESSING_PROFPERSEC

USER_PROCESSING_MEDIANMODE

USER_PROCESSING_BILATERALMODE

USER_PROCESSING_PEAKMODE

USER_PROCESSING_FLIP

USER_LASER_ENABLED

USER_LASER_VALUE

USER_TRIGGER_SYNC_SOURCE

USER_TRIGGER_SYNC_STRICTENABLED

USER_TRIGGER_SYNC_DIVIDER

USER_TRIGGER_SYNC_DELAY

USER_TRIGGER_COUNTER_TYPE

USER_TRIGGER_COUNTER_MAXVALUEENABLED

USER_TRIGGER_COUNTER_MAXVALUE

USER_TRIGGER_COUNTER_RESETTIMERENABLED

USER_TRIGGER_COUNTER_RESETTIMERVALUE

USER_TRIGGER_COUNTER_VALUE

USER_INPUT1_ENABLED

USER_INPUT1_MODE

USER_INPUT2_ENABLED

USER_INPUT2_MODE

USER_INPUT3_ENABLED

USER_INPUT3_MODE

USER_INPUT1_SAMPLES

USER_INPUT2_SAMPLES

USER_INPUT3_SAMPLES

USER_OUTPUT1_ENABLED

USER_OUTPUT1_MODE

USER_OUTPUT1_PULSEWIDTH

USER_OUTPUT2_ENABLED

USER_OUTPUT2_MODE

USER_OUTPUT2_PULSEWIDTH

USER_DUMP_ENABLED

USER_DUMP_CAPACITY

USER_DUMP_SIZE

USER_DUMP_TIMESTAMP

USER_DUMP_VIEW3D_MOTIONTYPE

USER_DUMP_VIEW3D_YSOURCE

USER_DUMP_VIEW3D_YSTEP

USER_DUMP_VIEW3D_PAINTMODE

USER_DUMP_VIEW3D_DECIMATION

USER_EIP_TCPPORT

USER_EIP_UDPPORT

USER_EIP_TCP_TTL

USER_EIP_TCP_TIMEOUT

USER_EIP_TCP_MULTICAST_ALLOC

USER_EIP_TCP_MULTICAST_NUM

USER_EIP_TCP_MULTICAST_ADDR

USER_COMPATIBILITY_RF625ENABLED

USER_COMPATIBILITY_RF625TCPPORT

USER_SENSOR_DOUBLESPEEDENABLED

USER_SENSOR_EDRTYPE

USER_SENSOR_EDRCOLUMNDIVIDER

USER_STREAMS_POINTSCOUNT

USER_ROI_SIZE

FACT_GENERAL_PROTOCOLREV = 0

FACT_GENERAL_DEVICETYPE

FACT_GENERAL_SERIAL

FACT_GENERAL_PCBSERIAL

FACT_GENERAL_LIFETIME

FACT_GENERAL_WORKTIME

FACT_GENERAL_STARTSCOUNT

FACT_GENERAL_FIRMWAREREV

FACT_GENERAL_HARDWAREREV

FACT_GENERAL_FSBLREV

FACT_GENERAL_CUSTOMERID

FACT_GENERAL_FPGAFREQ

FACT_GENERAL_SMR

FACT_GENERAL_MR

FACT_GENERAL_XSMR

FACT_GENERAL_XEMR

FACT_GENERAL_PIXDIVIDER

FACT_GENERAL_PROFDIVIDER

FACT_GENERAL_OEMDEVNAME

FACT_GENERAL_AUTHSTATUS

FACT_SENSOR_NAME

FACT_SENSOR_WIDTH

FACT_SENSOR_HEIGHT

FACT_SENSOR_PIXFREQ

FACT_SENSOR_FRMCONSTPART

FACT_SENSOR_FRMPERLINEPART

FACT_SENSOR_FPSOREXP

FACT_SENSOR_MINEXPOSURE

FACT_SENSOR_MAXEXPOSURE

FACT_SENSOR_IMGFLIP

FACT_NETWORK_MACADDR

FACT_NETWORK_FORCEAUTONEGTIME

FACT_NETWORK_WEBSOCKSERVICEPORT

FACT_NETWORK_WEBSOCKDATAPORT

FACT_NETWORK_WEBSOCKMATHPORT

FACT_LASER_WAVELENGTH

FACT_LASER_KOEFF1

FACT_LASER_KOEFF2

FACT_LASER_MINVALUE

FACT_LASER_MAXVALUE

FACT_PROFILES_MAXDUMPSIZE

FACT_EIP_IDENTITY_VENDORID

FACT_EIP_IDENTITY_DEVICETYPE

FACT_EIP_IDENTITY_PRODUCTCODE

FACT_EIP_IDENTITY_REV

FACT_EIP_TCPINTRF_CAPABILITY

FACT_EIP_TCPINTRF_PHY_PATHSIZE

FACT_EIP_TCPINTRF_PHY_CLASSID

FACT_EIP_TCPINTRF_PHY_INSTNUMBER

FACT_EIP_TCPINTRF_PHY_ATTRNUMBER

FACT_EIP_INTRFTYPE

FACT_EIP_INTRFCAPABILITY_BITS

FACT_EIP_INTRFCAPABILITY_SPEEDDUPCOUNT

FACT_EIP_INTRFCAPABILITY_SPEEDDUPLEX_SPEED

FACT_EIP_INTRFCAPABILITY_SPEEDDUPLEX_DUPLEX

FACT_SENSOR_ANALOGGAIN

FACT_SENSOR_DIGITALGAIN

FACT_SENSOR_BLACKODD

FACT_SENSOR_BLACKEVEN

FACT_SENSOR_HDRPIECEWISEDIV1

FACT_SENSOR_HDRPIECEWISEDIV2

FACT_SENSOR_INITREGS

USER_GENERAL_DEVICESTATE

USER_GENERAL_DEVICENAME

USER_GENERAL_SAVELOG

USER_SYSMON_FPGATEMP

USER_SYSMON_PARAMSCHANGED

USER_SYSMON_TEMPSENS00

USER_SYSMON_TEMPSENS00MAX

USER_SYSMON_TEMPSENS00MIN

USER_SYSMON_TEMPSENS01

USER_SYSMON_TEMPSENS01MAX

USER_SYSMON_TEMPSENS01MIN

USER_SYSMON_TEMPSENS10

USER_SYSMON_TEMPSENS10MAX

USER_SYSMON_TEMPSENS10MIN

USER_SYSMON_TEMPSENS11

USER_SYSMON_TEMPSENS11MAX

USER_SYSMON_TEMPSENS11MIN

USER_SENSOR_SYNCSOURCE

USER_SENSOR_FRAMERATE

USER_SENSOR_MAXFRAMERATE

USER_SENSOR_EXPOSURECONTROL

USER_SENSOR_EXPOSURE1

USER_SENSOR_EXPOSURE2

USER_SENSOR_EXPOSURE3

USER_SENSOR_EXPOSURE4

USER_SENSOR_MAXEXPOSURE

USER_ROI_ENABLED

USER_ROI_ACTIVE

USER_ROI_POSMODE

USER_ROI_POS

USER_ROI_MAXPOS

USER_ROI_REQPROFSIZE

USER_NETWORK_SPEED

USER_NETWORK_REQUIREDSPEED

USER_NETWORK_AUTONEG

USER_NETWORK_IP

USER_NETWORK_MASK

USER_NETWORK_GATEWAY

USER_NETWORK_HOSTIP

USER_NETWORK_HOSTPORT

USER_NETWORK_WEBPORT

USER_NETWORK_SERVICEPORT

USER_STREAMS_UDPENABLED

USER_STREAMS_FORMAT

USER_STREAMS_INCLUDEINTENSITY

USER_PROCESSING_THRESHOLD

USER_PROCESSING_PROFPERSEC

USER_PROCESSING_MEDIANMODE

USER_PROCESSING_BILATERALMODE

USER_PROCESSING_PEAKMODE

USER_PROCESSING_FLIP

USER_LASER_ENABLED

USER_LASER_VALUE

USER_TRIGGER_SYNC_SOURCE

USER_TRIGGER_SYNC_STRICTENABLED

USER_TRIGGER_SYNC_DIVIDER

USER_TRIGGER_SYNC_DELAY

USER_TRIGGER_COUNTER_TYPE

USER_TRIGGER_COUNTER_MAXVALUEENABLED

USER_TRIGGER_COUNTER_MAXVALUE

USER_TRIGGER_COUNTER_RESETTIMERENABLED

USER_TRIGGER_COUNTER_RESETTIMERVALUE

USER_TRIGGER_COUNTER_VALUE

USER_INPUT1_ENABLED

USER_INPUT1_MODE

USER_INPUT2_ENABLED

USER_INPUT2_MODE

USER_INPUT3_ENABLED

USER_INPUT3_MODE

USER_INPUT1_SAMPLES

USER_INPUT2_SAMPLES

USER_INPUT3_SAMPLES

USER_OUTPUT1_ENABLED

USER_OUTPUT1_MODE

USER_OUTPUT1_PULSEWIDTH

USER_OUTPUT2_ENABLED

USER_OUTPUT2_MODE

USER_OUTPUT2_PULSEWIDTH

USER_DUMP_ENABLED

USER_DUMP_CAPACITY

USER_DUMP_SIZE

USER_DUMP_TIMESTAMP

USER_DUMP_VIEW3D_MOTIONTYPE

USER_DUMP_VIEW3D_YSOURCE

USER_DUMP_VIEW3D_YSTEP

USER_DUMP_VIEW3D_PAINTMODE

USER_DUMP_VIEW3D_DECIMATION

USER_EIP_TCPPORT

USER_EIP_UDPPORT

USER_EIP_TCP_TTL

USER_EIP_TCP_TIMEOUT

USER_EIP_TCP_MULTICAST_ALLOC

USER_EIP_TCP_MULTICAST_NUM

USER_EIP_TCP_MULTICAST_ADDR

USER_COMPATIBILITY_RF625ENABLED

USER_COMPATIBILITY_RF625TCPPORT

USER_SENSOR_DOUBLESPEEDENABLED

USER_SENSOR_EDRTYPE

USER_SENSOR_EDRCOLUMNDIVIDER

USER_STREAMS_POINTSCOUNT

USER_ROI_SIZE

Пример использования с ключами:

```
{
...Search devices
...Establish connections
...Read parameters
}

// Get parameter of Device Name
parameter_t* name = get_parameter(scanner, parameter_names_array[USER_GENERAL_
↪DEVICENAME]);
if ((name != NULL) && (strcmp(name->type, parameter_value_types[PVT_
↪STRING])==0)
{
   char* str_name = name->val_str->value;
   printf("Current Device Name: %s\n", str_name);
}
```

Для более детального описания каждого параметра и его свойств см. *PARAMETERS*

set_parameter()

Функция установки конкретного параметра. При вызове данной функции происходит установка передаваемого параметра в локальном списке параметров в «ядре». Для отправки изменений в сканер необходимо вызвать функцию `write_params_to_scanner`.

rfUint8 **`set_parameter`**(scanner_base_t **device*, parameter_t **param*)
set_parameter - Set parameter

Return 0 if success

Parameters

- `device`: - ptr to scanner
- `param`: - setting parameter

Пример использования:

```
// Create value for scanners vector's type
vector_t* scanners = (vector_t*)calloc(1, sizeof (vector_t));
//Initialization vector
vector_init(&scanners);

// set IP Addr and NetMask for setting in network adapter settings.
uint32_t host_ip_addr = ntohl(inet_addr("192.168.1.2"));
uint32_t host_mask = ntohl(inet_addr("255.255.255.0"));
// call the function to change adapter settings inside the library.
set_platform_adapter_settings(host_mask, host_ip_addr);

// Search for RF627Old devices over network by Service Protocol.
search_scanners(scanners, kRF627_OLD, kSERVICE);

// Iterate over all discovered RF627Old in network and Establish connection.
for(size_t i = 0; i < vector_count(scanners); i++)
{
   scanner_base_t* scanner = vector_get(scanners,i);
   connect_to_scanner(scanner, kSERVICE);

   // Read parameters from device to the internal structure of the core
   read_params_from_scanner(scanner, kSERVICE);

   // Get parameter of Device Name
   parameter_t* name = get_parameter(scanner, "user_general_deviceName");
   if ((name != NULL) && (strcmp(name->type, "string_t")==0)
   {
      char* str_name = name->val_str->value;
      printf("Current Device Name: %s\n", str_name);

      char* new_name = "NEW NAME";
      memcpy(name->val_str->value, new_name, strlen(new_name)+1);
      set_parameter(scanner, name);
   }

   //  Write changes parameters to the device's memory
   write_params_to_scanner(scanner, kSERVICE);

   disconnect_from_scanner(scanner, kSERVICE);
}
```

write_params_to_scanner()

Функция записи локальных параметров из «ядра» в сканер. При вызове данной функции происходит отправка списка локальных параметров из «ядра» в сканер.

rfUint8 **write_params_to_scanner**(scanner_base_t *device, protocol_types_t protocol)

write_params_to_scanner - Write current parameters to device's memory

Return 0 on success

Parameters

- `device`: - ptr to scanner
- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
{
...Search devices
...Establish connections
...Read parameters
}

// Get parameter of Laser Enabled
parameter_t* laser_enabled = get_parameter(scanner, "user_laser_enabled");
if ((name != NULL) && (strcmp(name->type, "uint32_t")==0)
{
   uint32_t is_enabled = laser_enabled->val_uint32->value;
   printf("Current Laser State: %s\n", is_enabled == 0 ? "OFF" : "ON");

   uint32_t new_state;
   if (is_enabled == 1)
      new_state = 0;
   else
      new_state = 1;

   laser_enabled->val_uint32->value = new_state;

   set_parameter(scanner, laser_enabled);
}

//  Write changes parameters to the device's memory
write_params_to_scanner(scanner, kSERVICE);
```

send_command()

Функция отправки команд в сканер

rfUint8 **send_command**(scanner_base_t *device, command_t *command)

set_parameter - Search parameters by his name

Return param on success, else - null

Parameters

- `device`: - ptr to scanner

- `param_name`: - name of parameter

Для более детального описания команд и их свойств см. *General device commands*

2.2 API «обёртки» на C++

Эта библиотека позволяет упростить разработку приложений на языке C++

Для её использования в проектах C++ разработчику необходимо включить h-файлы библиотеки в свой проект, а также добавить к проекту «обёртку» в качестве статической или динамической программной библиотеки.

Для скачивания библиотеки см. *последние выпуски «обёртки» на C++*.
Для компиляции библиотеки см. *компиляция и запуск «обёртки» на C++*.

2.2.1 Инициализация SDK

Файл `rf62Xsdk.h` является основным файлом программного интерфейса (API) для разработки программ на языке C++ и определяет функциональность библиотеки-«обёртки» для rf62Xcore. `rf62Xsdk.h` содержит следующий набор классов и функций для инициализации SDK:

sdk_init()

Функция инициализации SDK. Должна быть вызванна один раз перед дальнейшими вызовами любых библиотечных функций:

bool `SDK::SCANNERS::RF62X::`**`sdk_init`**`()`
sdk_init - Initialize sdk library Must be called once before further calls to any library functions

Return true if success.

sdk_cleanup()

Функция для очистки ресурсов выделенных с помощью функции `sdk_init`:

void `SDK::SCANNERS::RF62X::`**`sdk_cleanup`**`()`
sdk_cleanup - Cleanup resources allocated with sdk_init() function

sdk_version()

Функция для получения текущей версии SDK:

std::string `SDK::SCANNERS::RF62X::`**`sdk_version`**`()`
sdk_version - Return info about SDK version

Return SDK version

2.2.2 Класс rf627old

Данный класс определён в файле `rf62Xsdk.h` и пердоставляет интерфейс для работы со сканерами серии RF627Old

`class rf627old`
rf627old - This class is the main interface for working with RF627-old series scanners.

search()

Функция для поиска устройств RF627 доступных в сети

std::vector<*rf627old* *> `SDK::SCANNERS::RF62X::`*`rf627old`*`::`**`search`**`(`PROTOCOLS *protocol*`)`
search - Search for *RF627old* devices over network

Return vector of rf627old devices

Parameters

- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Initialize sdk library
sdk_init();

// Print return rf627 sdk version
std::cout << "SDK version: " << sdk_version()                << std::endl;
std::cout << "========================================"      << std::endl;

// Create value for scanners vector's type
std::vector<rf627old*> list;
// Search for RF627old devices over network
list = rf627old::search(PROTOCOLS::SERVICE);

// Print count of discovered RF627Old in network by Service Protocol
std::cout << "Discovered: " << list.size() << " RF627Old"    << std::endl;
```

get_info()

Функция для получения информации о сканере из пакета приветствия (Hello-пакет)

rf627old::hello_info SDK::SCANNERS::RF62X::*rf627old*::**get_info**(PROTOCOLS *protocol* = PROTOCOLS::CURRENT)

get_info - Get information about scanner from hello packet

Return hello_info on success

Parameters

- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Initialize sdk library
sdk_init();

// Print return rf627 sdk version
std::cout << "SDK version: " << sdk_version()                 << std::endl;
std::cout << "========================================"      << std::endl;

// Create value for scanners vector's type
std::vector<rf627old*> list;
// Search for RF627old devices over network
list = rf627old::search(PROTOCOLS::SERVICE);

// Print count of discovered RF627Old in network by Service Protocol
std::cout << "Discovered: " << list.size() << " RF627Old"    << std::endl;

for (size_t i = 0; i < list.size(); i++)
{
   rf627old::hello_info info = list[i]->get_info();

   std::cout << "\n\n\nID scanner's list: " << i             << std::endl;
   std::cout << "----------------------------------------" << std::endl;
   std::cout << "Device information: "                      << std::endl;
   std::cout << "* Name\t: "     << info.device_name()      << std::endl;
   std::cout << "* Serial\t: "   << info.serial_number()    << std::endl;
   std::cout << "* IP Addr\t: "  << info.ip_address()       << std::endl;
   std::cout << "* MAC Addr\t: " << info.mac_address()      << std::endl;

   std::cout << "\nWorking ranges: "                         << std::endl;
   std::cout << "* Zsmr, mm\t: " << info.z_smr()            << std::endl;
   std::cout << "* Zmr , mm\t: " << info.z_mr()             << std::endl;
   std::cout << "* Xsmr, mm\t: " << info.x_smr()            << std::endl;
   std::cout << "* Xemr, mm\t: " << info.x_emr()            << std::endl;

   std::cout << "\nVersions: "                               << std::endl;
   std::cout << "* Firmware\t: " << info.firmware_version() << std::endl;
   std::cout << "* Hardware\t: " << info.hardware_version() << std::endl;
   std::cout << "----------------------------------------" << std::endl;
}

// Cleanup resources allocated with sdk_init()
sdk_cleanup();
```

connect()

Функция для установки соединения со сканером серии RF627

bool SDK::SCANNERS::RF62X::*rf627old*::**connect**(PROTOCOLS *protocol* = PROTOCOLS::CURRENT)

connect - Establish connection to the *RF627old* device

Return true on success

Parameters

- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Initialize sdk library
sdk_init();

// Create value for scanners vector's type
std::vector<rf627old*> list;
// Search for RF627old devices over network
list = rf627old::search(PROTOCOLS::SERVICE);

// Print count of discovered RF627Old in network by Service Protocol
std::cout << "Discovered: " << list.size() << " RF627Old"   << std::endl;

for (size_t i = 0; i < list.size(); i++)
{
   if (list[i]->connect())
      std::cout << "Connected to scanner №" << i << " successfully" <<␣
↪std::endl;
}
```

disconnect()

Функция для закрытия ранее установленного соединения со сканером серии RF627

bool SDK::SCANNERS::RF62X::*rf627old*::**disconnect**(PROTOCOLS *protocol* = PROTOCOLS::CURRENT)

disconnect_from_scanner - Close connection to the device

Return true on success

Parameters

- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Initialize sdk library
sdk_init();

// Create value for scanners vector's type
std::vector<rf627old*> list;
// Search for RF627old devices over network
list = rf627old::search(PROTOCOLS::SERVICE);
```

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```
// Print count of discovered RF627Old in network by Service Protocol
std::cout << "Discovered: " << list.size() << " RF627Old"   << std::endl;

for (size_t i = 0; i < list.size(); i++)
   list[i]->connect();

{
...some actions with scanners
}

for (size_t i = 0; i < list.size(); i++)
   list[i]->disconnect();
```

get_profile2D()

Функция для получения профиля со сканеров серии RF627

profile2D_t *SDK::SCANNERS::RF62X::*rf627old*::**get_profile2D**(bool *zero_points* = true, PROTOCOLS *protocol* = PROTOCOLS::CURRENT)

get_profile2D - Get 2D measurement from scanner's data stream

Return ptr to profile2D_t structure if success, else - null

Parameters

- `zero_points`: - include zero points in return profile2D
- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Initialize sdk library
sdk_init();

// Create value for scanners vector's type
std::vector<rf627old*> list;
// Search for RF627old devices over network
list = rf627old::search(PROTOCOLS::SERVICE);

// Print count of discovered RF627Old in network by Service Protocol
std::cout << "Discovered: " << list.size() << " RF627Old"   << std::endl;

// Iterate over all discovered RF627Old in network, connect to each of
// them and get a profile.
for(size_t i = 0; i < list.size(); i++)
{
   // Establish connection to the RF627 device by Service Protocol.
   list[i]->connect();

   // Get profile from scanner's data stream by Service Protocol.
```

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```
    profile2D_t* profile = list[i]->get_profile2D();
    if (profile != nullptr)
    {
        std::cout << "Profile information: "                    << std::endl;
        switch (profile->header.data_type) {
        case (uint8_t)PROFILE_DATA_TYPE::PIXELS:
            std::cout << "* DataType\t: "<< "PIXELS"            << std::endl;
            std::cout << "* Count\t: " << profile->pixels.size()<< std::endl;
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PIXELS_INTRP:
            std::cout << "* DataType\t: "<< "PIXELS_INTRP"      << std::endl;
            std::cout << "* Count\t: " << profile->pixels.size()<< std::endl;
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PROFILE:
            std::cout << "* DataType\t: "<< "PROFILE"           << std::endl;
            std::cout << "* Size\t: "  << profile->points.size()<< std::endl;
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PROFILE_INTRP:
            std::cout << "* DataType\t: "<< "PROFILE_INTRP"     << std::endl;
            std::cout << "* Size\t: "  << profile->points.size()<< std::endl;
            break;
        }
        delete profile;
        std::cout << "Profile was successfully received!"       << std::endl;
        std::cout << "----------------------------------------"<< std::endl;
    }else
    {
        std::cout << "Profile was not received!"                << std::endl;
        std::cout << "----------------------------------------"<< std::endl;
    }

    // Disconnect from scanner.
    list[i]->disconnect();
}

// Cleanup resources allocated with sdk_init()
sdk_cleanup();
```

read_params()

Функция получения текущих параметров сканера. При вызове данной функции SDK вычитывает со сканера все актуальные параметры, сохраняя их ввиде «списка параметров» для дальнейшей работы.

bool `SDK::SCANNERS::RF62X::rf627old::read_params`(PROTOCOLS *protocol* = PROTOCOLS::CURRENT)

read_params - Read parameters from device to internal structure. This structure is accessible via get_params() function

Return true on success

Parameters

- `protocol`: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Initialize sdk library
sdk_init();

// Create value for scanners vector's type
std::vector<rf627old*> scanners;
// Search for RF627old devices over network
scanners = rf627old::search(PROTOCOLS::SERVICE);

// Print count of discovered RF627Old in network by Service Protocol
std::cout << "Discovered: " << scanners.size() << " RF627Old"  << std::endl;

// Iterate over all discovered RF627Old in network, connect to each of
// them and read/set parameters.
for(size_t i = 0; i < scanners.size(); i++)
{
   // Establish connection to the RF627 device by Service Protocol.
   scanners[i]->connect();

   // read params from RF627 device by Service Protocol.
   scanners[i]->read_params();

   {
   ...some actions with params
   }

   // Disconnect from scanner.
   scanners[i]->disconnect();
}
```

get_param()

Функция получения конкретного параметра по его имени (ключу). При вызове данной функции SDK осуществляет поиск нужного параметра из последних прочитанных при вызове функции read_params. В случае, если запрашиваемый параметр отсутствует в конкретном сканере, функция вернёт null.

param_t *SDK::SCANNERS::RF62X::*rf627old*::**get_param**(std::string *param_name*)

get_param - Search parameters by his name

Return param on success, else - null

Parameters

- param_name: - name of parameter

Пример использования:

```
{
...Initialize sdk library
...Search for RF627old
}

// Establish connection to the RF627 device by Service Protocol.
scanners[i]->connect();
```

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```
// read params from RF627 device by Service Protocol.
scanners[i]->read_params();

// Get parameter of Device Name
param_t* name = scanners[i]->get_param("user_general_deviceName");
if (name->type == "string_t")
{
   std::string str_name = name->get_value<value_str>();
   std::cout << "Current Device Name \t: " << str_name     << std::endl;
}

// Get parameter of Device IP Addr
param_t* ip_addr = scanners[i]->get_param("user_network_ip");
if (ip_addr->type == "u32_arr_t")
{
   std::vector <uint32_t> ip = ip_addr->get_value<array_uint32>();
   std::cout << "Current Device IP\t: ";
   for(auto i: ip) std::cout<<std::to_string(i)<<".";std::cout<<std::endl;
}

// Get parameter of Laser Enabled
param_t* laser_enabled = scanners[i]->get_param("user_laser_enabled");
if (laser_enabled->type == "uint32_t")
{
   bool isEnabled = laser_enabled->get_value<value_uint32>();
   std::cout<<"Current Laser State\t: "<<(isEnabled?"ON":"OFF")<<std::endl;
}
```

Для более удобной работы с параметрами можно использовать соответствующие «ключи» (ключ имени параметра, тип параметра и доступ к параметру).

param_t *SDK::SCANNERS::RF62X::*rf627old*::**get_param**(*PARAM_NAME_KEY param_key*)

get_param - Search parameters by his name's key

Return param on success, else - null

Parameters

- param_name: - name's key of parameter

Для этого в файле rt62Xtypes.h находятся следующие enum:

enum SDK::SCANNERS::RF62X::**PARAM_VALUE_TYPE**

Values:

UNKN_PARAM_TYPE = 0

UINT_PARAM_TYPE = 1

UINT64_PARAM_TYPE = 2

INT_PARAM_TYPE = 3

INT64_PARAM_TYPE = 4

FLOAT_PARAM_TYPE = 5

DOUBLE_PARAM_TYPE = 6

UINT32_ARRAY_PARAM_TYPE = 7

UINT64_ARRAY_PARAM_TYPE = 8

INT32_ARRAY_PARAM_TYPE = 9

INT64_ARRAY_PARAM_TYPE = 10

FLT_ARRAY_PARAM_TYPE = 11

DBL_ARRAY_PARAM_TYPE = 12

STRING_PARAM_TYPE = 13

enum SDK::SCANNERS::RF62X::**PARAM_ACCESS_TYPE**

Values:

PAT_UNKN = 0

PAT_READ_ONLY = 1

PAT_WRITE = 2

PAT_RESTRICTED = 3

enum SDK::SCANNERS::RF62X::**PARAM_NAME_KEY**

Values:

FACT_GENERAL_PROTOCOLREV = 0

FACT_GENERAL_DEVICETYPE

FACT_GENERAL_SERIAL

FACT_GENERAL_PCBSERIAL

FACT_GENERAL_LIFETIME

FACT_GENERAL_WORKTIME

FACT_GENERAL_STARTSCOUNT

FACT_GENERAL_FIRMWAREREV

FACT_GENERAL_HARDWAREREV

FACT_GENERAL_FSBLREV

FACT_GENERAL_CUSTOMERID

FACT_GENERAL_FPGAFREQ

FACT_GENERAL_SMR

FACT_GENERAL_MR

FACT_GENERAL_XSMR

FACT_GENERAL_XEMR

FACT_GENERAL_PIXDIVIDER

FACT_GENERAL_PROFDIVIDER

FACT_GENERAL_OEMDEVNAME

FACT_GENERAL_AUTHSTATUS

FACT_SENSOR_NAME

FACT_SENSOR_WIDTH

FACT_SENSOR_HEIGHT

FACT_SENSOR_PIXFREQ

FACT_SENSOR_FRMCONSTPART

FACT_SENSOR_FRMPERLINEPART

FACT_SENSOR_FPSOREXP

FACT_SENSOR_MINEXPOSURE

FACT_SENSOR_MAXEXPOSURE

FACT_SENSOR_IMGFLIP

FACT_NETWORK_MACADDR

FACT_NETWORK_FORCEAUTONEGTIME

FACT_NETWORK_WEBSOCKSERVICEPORT

FACT_NETWORK_WEBSOCKDATAPORT

FACT_NETWORK_WEBSOCKMATHPORT

FACT_LASER_WAVELENGTH

FACT_LASER_KOEFF1

FACT_LASER_KOEFF2

FACT_LASER_MINVALUE

FACT_LASER_MAXVALUE

FACT_PROFILES_MAXDUMPSIZE

FACT_EIP_IDENTITY_VENDORID

FACT_EIP_IDENTITY_DEVICETYPE

FACT_EIP_IDENTITY_PRODUCTCODE

FACT_EIP_IDENTITY_REV

FACT_EIP_TCPINTRF_CAPABILITY

FACT_EIP_TCPINTRF_PHY_PATHSIZE

FACT_EIP_TCPINTRF_PHY_CLASSID

FACT_EIP_TCPINTRF_PHY_INSTNUMBER

FACT_EIP_TCPINTRF_PHY_ATTRNUMBER

FACT_EIP_INTRFTYPE

FACT_EIP_INTRFCAPABILITY_BITS

FACT_EIP_INTRFCAPABILITY_SPEEDDUPCOUNT

FACT_EIP_INTRFCAPABILITY_SPEEDDUPLEX_SPEED

FACT_EIP_INTRFCAPABILITY_SPEEDDUPLEX_DUPLEX

FACT_SENSOR_ANALOGGAIN

FACT_SENSOR_DIGITALGAIN

FACT_SENSOR_BLACKODD

FACT_SENSOR_BLACKEVEN

FACT_SENSOR_HDRPIECEWISEDIV1

FACT_SENSOR_HDRPIECEWISEDIV2

FACT_SENSOR_INITREGS

USER_GENERAL_DEVICESTATE

USER_GENERAL_DEVICENAME

USER_GENERAL_SAVELOG

USER_SYSMON_FPGATEMP

USER_SYSMON_PARAMSCHANGED

USER_SYSMON_TEMPSENS00

USER_SYSMON_TEMPSENS00MAX

USER_SYSMON_TEMPSENS00MIN

USER_SYSMON_TEMPSENS01

USER_SYSMON_TEMPSENS01MAX

USER_SYSMON_TEMPSENS01MIN

USER_SYSMON_TEMPSENS10

USER_SYSMON_TEMPSENS10MAX

USER_SYSMON_TEMPSENS10MIN

USER_SYSMON_TEMPSENS11

USER_SYSMON_TEMPSENS11MAX

USER_SYSMON_TEMPSENS11MIN

USER_SENSOR_SYNCSOURCE

USER_SENSOR_FRAMERATE

USER_SENSOR_MAXFRAMERATE

USER_SENSOR_EXPOSURECONTROL

USER_SENSOR_EXPOSURE1

USER_SENSOR_EXPOSURE2

USER_SENSOR_EXPOSURE3

USER_SENSOR_EXPOSURE4

USER_SENSOR_MAXEXPOSURE

USER_ROI_ENABLED

USER_ROI_ACTIVE

USER_ROI_POSMODE

USER_ROI_POS

USER_ROI_MAXPOS

USER_ROI_REQPROFSIZE

USER_NETWORK_SPEED

USER_NETWORK_REQUIREDSPEED

USER_NETWORK_AUTONEG

USER_NETWORK_IP

USER_NETWORK_MASK

USER_NETWORK_GATEWAY

USER_NETWORK_HOSTIP

USER_NETWORK_HOSTPORT

USER_NETWORK_WEBPORT

USER_NETWORK_SERVICEPORT

USER_STREAMS_UDPENABLED

USER_STREAMS_FORMAT

USER_STREAMS_INCLUDEINTENSITY

USER_PROCESSING_THRESHOLD

USER_PROCESSING_PROFPERSEC

USER_PROCESSING_MEDIANMODE

USER_PROCESSING_BILATERALMODE

USER_PROCESSING_PEAKMODE

USER_PROCESSING_FLIP

USER_LASER_ENABLED

USER_LASER_VALUE

USER_TRIGGER_SYNC_SOURCE

USER_TRIGGER_SYNC_STRICTENABLED

USER_TRIGGER_SYNC_DIVIDER

USER_TRIGGER_SYNC_DELAY

USER_TRIGGER_COUNTER_TYPE

USER_TRIGGER_COUNTER_MAXVALUEENABLED

USER_TRIGGER_COUNTER_MAXVALUE

USER_TRIGGER_COUNTER_RESETTIMERENABLED

USER_TRIGGER_COUNTER_RESETTIMERVALUE

USER_TRIGGER_COUNTER_VALUE

USER_INPUT1_ENABLED

USER_INPUT1_MODE

USER_INPUT2_ENABLED

USER_INPUT2_MODE

USER_INPUT3_ENABLED

USER_INPUT3_MODE

USER_INPUT1_SAMPLES

USER_INPUT2_SAMPLES

USER_INPUT3_SAMPLES

USER_OUTPUT1_ENABLED

USER_OUTPUT1_MODE

USER_OUTPUT1_PULSEWIDTH

USER_OUTPUT2_ENABLED

USER_OUTPUT2_MODE

USER_OUTPUT2_PULSEWIDTH

USER_DUMP_ENABLED

USER_DUMP_CAPACITY

USER_DUMP_SIZE

USER_DUMP_TIMESTAMP

USER_DUMP_VIEW3D_MOTIONTYPE

USER_DUMP_VIEW3D_YSOURCE

USER_DUMP_VIEW3D_YSTEP

USER_DUMP_VIEW3D_PAINTMODE

USER_DUMP_VIEW3D_DECIMATION

USER_EIP_TCPPORT

USER_EIP_UDPPORT

USER_EIP_TCP_TTL

USER_EIP_TCP_TIMEOUT

USER_EIP_TCP_MULTICAST_ALLOC

USER_EIP_TCP_MULTICAST_NUM

USER_EIP_TCP_MULTICAST_ADDR

USER_COMPATIBILITY_RF625ENABLED

USER_COMPATIBILITY_RF625TCPPORT

USER_SENSOR_DOUBLESPEEDENABLED

USER_SENSOR_EDRTYPE

USER_SENSOR_EDRCOLUMNDIVIDER

USER_STREAMS_POINTSCOUNT

USER_ROI_SIZE

Пример использования с ключами:

```
{
...Initialize sdk library
...Search for RF627old
}

// Establish connection to the RF627 device by Service Protocol.
scanners[i]->connect();

// read params from RF627 device by Service Protocol.
scanners[i]->read_params();

// Get parameter of Device Name
param_t* name = scanners[i]->get_param(PARAM_NAME_KEY::USER_GENERAL_
↪DEVICENAME);
if (name->type == param_value_types[(int)PARAM_VALUE_TYPE::STRING_PARAM_TYPE])
{
   std::string str_name = name->get_value<value_str>();
   std::cout << "Current Device Name \t: " << str_name     << std::endl;
}

// Get parameter of Device IP Addr
param_t* ip_addr = scanners[i]->get_param(PARAM_NAME_KEY::USER_NETWORK_IP);
if (ip_addr->type == param_value_types[(int)PARAM_VALUE_TYPE::UINT32_ARRAY_
↪PARAM_TYPE])
{
   std::vector <uint32_t> ip = ip_addr->get_value<array_uint32>();
   std::cout << "Current Device IP\t: ";
}

// Get parameter of Laser Enabled
param_t* laser_enabled = scanners[i]->get_param(PARAM_NAME_KEY::USER_LASER_
↪ENABLED);
if (laser_enabled->type == param_value_types[(int)PARAM_VALUE_TYPE::UINT_
↪PARAM_TYPE])
{
   bool isEnabled = laser_enabled->get_value<value_uint32>();
   std::cout<<"Current Laser State\t: "<<(isEnabled?"ON":"OFF")<<std::endl;
}
```

Для более детального описания каждого параметра и его свойств см. *PARAMETERS*

set_param()

Функция установки конкретного параметра. При вызове данной функции происходит установка передаваемого параметра в локальном списке параметров в SDK. Для отправки изменений в сканер необходимо вызвать функцию `write_params`.

bool `SDK::SCANNERS::RF62X::rf627old::set_param`(param_t **param*)

set_param - set parameter

Return true on success, else - false

Parameters

- `param`: - prt to parameter

Пример использования:

```
{
...Initialize sdk library
...Search for RF627old
}

// Establish connection to the RF627 device by Service Protocol.
scanners[i]->connect();

// read params from RF627 device by Service Protocol.
scanners[i]->read_params();

// Get parameter of Device Name
param_t* name = scanners[i]->get_param(PARAM_NAME_KEY::USER_GENERAL_
↪DEVICENAME);
if (name->type == param_value_types[(int)PARAM_VALUE_TYPE::STRING_PARAM_TYPE])
{
   std::string str_name = name->get_value<value_str>();
   std::cout << "Current Device Name \t: " << str_name     << std::endl;

   // Add "_TEST" to the ending of the current name
   str_name += "_TEST";
   name->set_value<value_str>(str_name);
   std::cout << "New Device Name \t: " << str_name         << std::endl;
   std::cout << "----------------------------------------"<< std::endl;

   scanners[i]->set_param(name);
}

// Get parameter of Device IP Addr
param_t* ip_addr = scanners[i]->get_param(PARAM_NAME_KEY::USER_NETWORK_IP);
if (ip_addr->type == param_value_types[(int)PARAM_VALUE_TYPE::UINT32_ARRAY_
↪PARAM_TYPE])
{
   std::vector <uint32_t> ip = ip_addr->get_value<array_uint32>();
   std::cout << "Current Device IP\t: ";
   for(auto i: ip) std::cout<<std::to_string(i)<<".";std::cout<<std::endl;

   // Change last digit of IP address (e.g. 192.168.1.30 -> 192.168.1.31)
   ip[3]++;
   ip_addr->set_value<array_uint32>(ip);
   std::cout << "New Device IP\t: ";
   for(auto i: ip) std::cout<<std::to_string(i)<<".";std::cout<<std::endl;
   std::cout << "----------------------------------------"<< std::endl;

   scanners[i]->set_param(ip_addr);
}

// Get parameter of Laser Enabled
param_t* laser_enabled = scanners[i]->get_param(PARAM_NAME_KEY::USER_LASER_
↪ENABLED);
if (laser_enabled->type == param_value_types[(int)PARAM_VALUE_TYPE::UINT_
↪PARAM_TYPE])
```

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(продолжение с предыдущей страницы)

```
{
   bool isEnabled = laser_enabled->get_value<value_uint32>();
   std::cout<<"Current Laser State\t: "<<(isEnabled?"ON":"OFF")<<std::endl;

   // Change the current state to the opposite
   isEnabled = !isEnabled;
   laser_enabled->set_value<value_uint32>(!isEnabled);
   std::cout<<"New Laser State\t: "<<(isEnabled?"ON":"OFF")<<std::endl;
   std::cout << "----------------------------------------"<< std::endl;

   scanners[i]->set_param(laser_enabled);
}

//  Write changes parameters to the device's memory
scanners[i]->write_params();

// Disconnect from scanner.
scanners[i]->disconnect();
```

write_params()

Функция записи локальных параметров из SDK в сканер. При вызове данной функции происходит отправка списка локальных параметров из SDK в сканер.

bool SDK::SCANNERS::RF62X::*rf627old*::**write_params**(PROTOCOLS *protocol* = PROTOCOLS::CURRENT)

write_params - Write current parameters to device's memory

Return true on success

Parameters

- protocol: - protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
{
...Initialize sdk library
...Search for RF627old
}

// Establish connection to the RF627 device by Service Protocol.
scanners[i]->connect();

// Read params from RF627 device by Service Protocol.
scanners[i]->read_params();

{
...Some steps to change scanner's parameters
}

//  Write changes parameters to the device's memory
scanners[i]->write_params();

// Disconnect from scanner.
scanners[i]->disconnect();
```

send_cmd()

Функция отправки команд в сканер

bool SDK::SCANNERS::RF62X::*rf627old*::**send_cmd**(**const** char ***command_name*, int *arg_count*, ...)

Для более детального описания команд и их свойств см. *General device commands*

2.3 API «обёртки» на C#

Эта «обёртка» представляет собой библиотеку .NET, написанную на языке C#, которая позволяет упростить разработку приложений на языках C#, Visual Basic .NET, C++/CLI и JScript .NET

Для её использования в проектах .NET разработчику необходимо собрать или скачать динамическую программную библиотеку **rf62Xsdk.dll**, после чего добавить библиотеку к ссылкам (references) проекта, а также собрать или скачать библиотеку **rf62Xcore.dll**, добавив её в папку к исполняемому файлу проекта.

Для скачивания библиотеки см. *последние выпуски «обёртки» на C#*.
Для компиляции библиотеки см. *компиляция и запуск «обёртки» на C#*.

2.3.1 Инициализация SDK

Файл `rf62Xsdk.cs` является основным файлом программного интерфейса (API) для разработки программ на языке C# и определяет функциональность библиотеки-«обёртки» для rf62Xcore. `rf62Xsdk.cs` содержит следующий набор классов и функций для инициализации SDK:

SdkInit()

Функция инициализации SDK. Должна быть вызванна один раз перед дальнейшими вызовами любых библиотечных функций:

static bool SDK.SCANNERS.RF62X.SdkInit()
SdkInit - Initialize sdk library

Must be called once before further calls to any library functions

Return true if success.

SdkCleanup()

Функция для очистки ресурсов выделенных с помощью функции `sdk_init`:

static void SDK.SCANNERS.RF62X.SdkCleanup()
SdkCleanup - Cleanup resources allocated with sdk_init() function

SdkVersion()

Функция для получения текущей версии SDK:

static string SDK.SCANNERS.RF62X.SdkVersion()
SdkVersion - Return info about SDK version

Return SDK version

2.3.2 Класс rf627old

Данный класс определён в файле `rf62Xsdk.cs` и пердоставляет интерфейс для работы со сканерами серии RF627Old

class RF627old
RF627old - This class is the main interface for working with RF627-old series scanners.

Search()

Функция для поиска устройств RF627 доступных в сети

static List<RF627old> SDK.SCANNERS.RF62X.RF627old.Search(PROTOCOLS_TYPES protocol =
Search for *RF627old* devices over network

Return List of *RF627old* devices

Parameters

- `protocol`: protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Start initialization of the library core
RF62X.SdkInit();

// Print return rf62X sdk version
Console.WriteLine("SDK version: {0}", RF62X.SdkVersion());
Console.WriteLine("========================================");

// Search for RF627old devices over network
List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();

// Print count of discovered RF627Old in network by Service Protocol
Console.WriteLine("Discovered {0} scanners", Scanners.Count);
```

GetInfo()

Функция для получения информации о сканере из пакета приветствия (Hello-пакет)

HelloInfo SDK.SCANNERS.RF62X.RF627old.GetInfo(PROTOCOLS_TYPES protocol = PROTOCO

Get information about scanner from hello packet

Return Hello_info on success

Parameters

- `protocol`: protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Start initialization of the library core
RF62X.SdkInit();

// Search for RF627old devices over network
List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();

// Print count of discovered RF627Old in network by Service Protocol
Console.WriteLine("Discovered {0} scanners", Scanners.Count);

for (int i = 0; i < Scanners.Count; i++)
{
   RF62X.HelloInfo info = Scanners[i].GetInfo();

   Console.WriteLine("\n\n\nID scanner's list: {0}", i);
   Console.WriteLine("----------------------------------------");
   Console.WriteLine("Device information: ");
   Console.WriteLine("* Name\t: {0}", info.device_name);
   Console.WriteLine("* Serial\t: {0}", info.serial_number);
   Console.WriteLine("* IP Addr\t: {0}", info.ip_address);
   Console.WriteLine("* MAC Addr\t: {0}", info.mac_address);

   Console.WriteLine("Working ranges: ");
   Console.WriteLine("* Zsmr, mm\t: {0}", info.z_smr);
   Console.WriteLine("* Zmr , mm\t: {0}", info.z_mr);
   Console.WriteLine("* Xsmr, mm\t: {0}", info.x_smr);
   Console.WriteLine("* Xemr, mm\t: {0}", info.x_emr);

   Console.WriteLine("\nVersions: ");
   Console.WriteLine("* Firmware\t: {0}", info.firmware_version);
   Console.WriteLine("* Hardware\t: {0}", info.hardware_version);
   Console.WriteLine("----------------------------------------");
}

// Cleanup resources allocated with sdk_init()
RF62X.SdkCleanup();
```

Connect()

Функция для установки соединения со сканером серии RF627

bool SDK.SCANNERS.RF62X.RF627old.Connect(PROTOCOLS_TYPES protocol = PROTOCOLS_TYPES
Establish connection to the *RF627old* device

Return true on success

Parameters

- `protocol`: protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Start initialization of the library core
RF62X.SdkInit();

// Search for RF627old devices over network
List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();

// Print count of discovered RF627Old in network by Service Protocol
Console.WriteLine("Discovered {0} scanners", Scanners.Count);

for (int i = 0; i < Scanners.Count; i++)
{
   // Establish connection to the RF627 device by Service Protocol.
   if (Scanners[i].Connect())
      Console.WriteLine("Connected to scanner №{0} successfully", i);
}

// Cleanup resources allocated with sdk_init()
RF62X.SdkCleanup();
```

Disconnect()

Функция для закрытия ранее установленного соединения со сканером серии RF627

bool SDK.SCANNERS.RF62X.RF627old.Disconnect(PROTOCOLS_TYPES protocol = PROTOCOLS_TY
Close connection to the device

Return true on success

Parameters

- `protocol`: protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Start initialization of the library core
RF62X.SdkInit();

// Search for RF627old devices over network
List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();

// Print count of discovered RF627Old in network by Service Protocol
Console.WriteLine("Discovered {0} scanners", Scanners.Count);
```

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```
// Establish connection to the RF627 device by Service Protocol.
for (int i = 0; i < Scanners.Count; i++)
   Scanners[i].Connect();

{
...some actions with scanners
}

for (int i = 0; i < Scanners.Count; i++)
   Scanners[i].Disconnect();
```

GetProfile()

Функция для получения профиля со сканеров серии RF627

Profile SDK.SCANNERS.RF62X.RF627old.GetProfile(PROTOCOLS_TYPES protocol = PROTOC

Get 2D measurement from scanner's data stream

Return Profile

Parameters

- `protocol`: protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Start initialization of the library core
RF62X.SdkInit();

// Search for RF627old devices over network
List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();

// Print count of discovered RF627Old in network by Service Protocol
Console.WriteLine("Discovered {0} scanners", Scanners.Count);

// foreach over an scanners list
for (int i = 0; i < Scanners.Count; i++)
{
   // Establish connection to the RF627 device by Service Protocol.
   Scanners[i].Connect();

   // Get profile from scanner's data stream by Service Protocol.
   RF62X.Profile profile = Scanners[i].GetProfile();
   if (profile.header != null)
   {
      Console.WriteLine("Profile information: ");
      switch (profile.header.data_type)
      {
      case RF62X.PROFILE_TYPE.PIXELS_NORMAL:
         Console.WriteLine("* DataType\t: PIXELS");
         Console.WriteLine("* Count\t: {0}", profile.pixels.Count);
         break;
      case RF62X.PROFILE_TYPE.PROFILE_NORMAL:
         Console.WriteLine("* DataType\t: PROFILE");
```

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(продолжение с предыдущей страницы)

```
            Console.WriteLine("* Size\t: {0}", profile.points.Count);
            break;
         case RF62X.PROFILE_TYPE.PIXELS_INTERPOLATED:
            Console.WriteLine("* DataType\t: PIXELS");
            Console.WriteLine("* Count\t: {0}", profile.pixels.Count);
            break;
         case RF62X.PROFILE_TYPE.PROFILE_INTERPOLATED:
            Console.WriteLine("* DataType\t: PROFILE");
            Console.WriteLine("* Size\t: {0}", profile.points.Count);
            break;
         default:
            break;
         }
         Console.WriteLine("Profile was successfully received!");
         Console.WriteLine("----------------------------------------");
      }else
      {
         Console.WriteLine("Profile was not received!");
         Console.WriteLine("----------------------------------------");
      }

      // Disconnect from scanner.
      Scanners[i].Disconnect();
   }

   // Cleanup resources allocated with sdk_init()
   RF62X.SdkCleanup();
```

ReadParams()

Функция получения текущих параметров сканера. При вызове данной функции SDK вычитывает со сканера все актуальные параметры, сохраняя их ввиде «списка параметров» для дальнейшей работы.

bool SDK.SCANNERS.RF62X.RF627old.ReadParams(PROTOCOLS_TYPES protocol = PROTOCOLS_T

Read parameters from device to internal structure. This structure is accessible via *GetParam()* functions

Return true on success

Parameters

- `protocol`: protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
// Start initialization of the library core
RF62X.SdkInit();

// Search for RF627old devices over network
List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();

// Print count of discovered RF627Old in network by Service Protocol
Console.WriteLine("Discovered {0} scanners", Scanners.Count);
```

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(продолжение с предыдущей страницы)

```
// foreach over an scanners list
for (int i = 0; i < Scanners.Count; i++)
{
   // Establish connection to the RF627 device by Service Protocol.
   Scanners[i].Connect();

   // read params from RF627 device by Service Protocol.
   Scanners[i].ReadParams();

   {
   ...some actions with params
   }

   // Disconnect from scanner.
   Scanners[i].Disconnect();
}
```

GetParam()

Функция получения конкретного параметра по его имени (ключу). При вызове данной функции SDK осуществляет поиск нужного параметра из последних прочитанных при вызове функции ReadParams. В случае, если запрашиваемый параметр отсутствует в конкретном сканере, функция вернёт null.

dynamic SDK.SCANNERS.RF62X.RF627old.GetParam(string nameKey)

Search parameters by his name

Return param on success, else - null

Parameters

- `nameKey`: name of parameter

Пример использования:

```
{
...Initialize sdk library
...Search for RF627old
}

// Establish connection to the RF627 device by Service Protocol.
Scanners[i].Connect();

// read params from RF627 device by Service Protocol.
Scanners[i].ReadParams();

// Get parameter of Device Name
RF62X.Param<string> name = Scanners[i].GetParam("user_general_deviceName");
if (name != null)
{
   string strName = name.GetValue();
   Console.WriteLine("\n\nCurrent Device Name \t: {0}", strName);
}

// Get parameter of Device IP Addr
```

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(продолжение с предыдущей страницы)

```
RF62X.Param<List<uint>> ipAddr = Scanners[i].GetParam("user_network_ip");
if (ipAddr != null)
{
   List<uint> ip = ipAddr.GetValue();
   Console.WriteLine("Current Device IP Addr\t: {0}.{1}.{2}.{3}", ip[0],␣
↪ip[1], ip[2], ip[3]);
}

// Get parameter of Laser Enabled
RF62X.Param<uint> laserEnabled = Scanners[i].GetParam("user_laser_enabled");
if (laserEnabled != null)
{
   bool isLaserEnabled = Convert.ToBoolean(laserEnabled.GetValue());
   Console.WriteLine("Current Laser State\t: {0}", isLaserEnabled ? "ON" :
↪"OFF");
}
```

Для более удобной работы с параметрами можно использовать соответствующие «ключи» (ключ имени параметра, тип параметра и доступ к параметру).

dynamic SDK.SCANNERS.RF62X.RF627old.GetParam(Params.Description paramInfo)

Search parameters by his info

Return param on success, else - null

Parameters

- `paramInfo`: info of parameter

Для этого в файле `rt62Xtypes.cs` находятся `class`:

class Params

Public Static Functions

static List<Description> SDK.SCANNERS.RF62X.Params.GetParamsDescriptionList()

class Description

Public Functions

Type SDK.SCANNERS.RF62X.Params.Description.GetParamType()

Public Members

string SDK.SCANNERS.RF62X.Params.Description.Key

string SDK.SCANNERS.RF62X.Params.Description.Type

class User

class Compatibility

Property

```
property SDK::SCANNERS::RF62X::Params::rf625Enabled
property SDK::SCANNERS::RF62X::Params::rf625TCPPort
class Dump
```

Property

```
property SDK::SCANNERS::RF62X::Params::enabled
property SDK::SCANNERS::RF62X::Params::capacity
property SDK::SCANNERS::RF62X::Params::size
property SDK::SCANNERS::RF62X::Params::timeStamp
class View3D
```

Property

```
property SDK::SCANNERS::RF62X::Params::motionType
property SDK::SCANNERS::RF62X::Params::ySource
property SDK::SCANNERS::RF62X::Params::yStep
property SDK::SCANNERS::RF62X::Params::paintMode
property SDK::SCANNERS::RF62X::Params::decimation
class Eip
```

Property

```
property SDK::SCANNERS::RF62X::Params::tcpPort
property SDK::SCANNERS::RF62X::Params::udpPort
property SDK::SCANNERS::RF62X::Params::tcpTTL
property SDK::SCANNERS::RF62X::Params::tcpTimeout
property SDK::SCANNERS::RF62X::Params::multicastAlloc
property SDK::SCANNERS::RF62X::Params::multicastNum
property SDK::SCANNERS::RF62X::Params::multicastAddr
class General
```

Property

```
property SDK::SCANNERS::RF62X::Params::deviceState
property SDK::SCANNERS::RF62X::Params::deviceName
property SDK::SCANNERS::RF62X::Params::saveLog
class Inputs1
```

Property

```
property SDK::SCANNERS::RF62X::Params::enabled
property SDK::SCANNERS::RF62X::Params::mode
property SDK::SCANNERS::RF62X::Params::samples
class Inputs2
```

Property

```
property SDK::SCANNERS::RF62X::Params::enabled
property SDK::SCANNERS::RF62X::Params::mode
property SDK::SCANNERS::RF62X::Params::samples
class Inputs3
```

Property

```
property SDK::SCANNERS::RF62X::Params::enabled
property SDK::SCANNERS::RF62X::Params::mode
property SDK::SCANNERS::RF62X::Params::samples
class Laser
```

Property

```
property SDK::SCANNERS::RF62X::Params::enabled
property SDK::SCANNERS::RF62X::Params::value
property SDK::SCANNERS::RF62X::Params::preset
property SDK::SCANNERS::RF62X::Params::params_mask
class NetWork
```

Property

```
property SDK::SCANNERS::RF62X::Params::speed
property SDK::SCANNERS::RF62X::Params::requiredSpeed
property SDK::SCANNERS::RF62X::Params::autoNeg
property SDK::SCANNERS::RF62X::Params::ip
property SDK::SCANNERS::RF62X::Params::mask
property SDK::SCANNERS::RF62X::Params::gateway
property SDK::SCANNERS::RF62X::Params::hostIP
property SDK::SCANNERS::RF62X::Params::hostPort
property SDK::SCANNERS::RF62X::Params::webPort
property SDK::SCANNERS::RF62X::Params::servicePort
```

```
class Outputs1
```

Property

```
property SDK::SCANNERS::RF62X::Params::enabled
property SDK::SCANNERS::RF62X::Params::mode
property SDK::SCANNERS::RF62X::Params::pulseWidth
```

```
class Outputs2
```

Property

```
property SDK::SCANNERS::RF62X::Params::enabled
property SDK::SCANNERS::RF62X::Params::mode
property SDK::SCANNERS::RF62X::Params::pulseWidth
```

```
class Processing
```

Property

```
property SDK::SCANNERS::RF62X::Params::threshold
property SDK::SCANNERS::RF62X::Params::profPerSec
property SDK::SCANNERS::RF62X::Params::medianMode
property SDK::SCANNERS::RF62X::Params::bilateralMode
property SDK::SCANNERS::RF62X::Params::peakMode
property SDK::SCANNERS::RF62X::Params::flip
```

```
class Roi
```

Property

```
property SDK::SCANNERS::RF62X::Params::enable
property SDK::SCANNERS::RF62X::Params::active
property SDK::SCANNERS::RF62X::Params::posMode
property SDK::SCANNERS::RF62X::Params::pos
property SDK::SCANNERS::RF62X::Params::maxPos
property SDK::SCANNERS::RF62X::Params::reqProfSize
property SDK::SCANNERS::RF62X::Params::size
```

```
class Sensor
```

Property

```
property SDK::SCANNERS::RF62X::Params::syncSource
property SDK::SCANNERS::RF62X::Params::framerate
property SDK::SCANNERS::RF62X::Params::maxFramerate
property SDK::SCANNERS::RF62X::Params::exposureControl
property SDK::SCANNERS::RF62X::Params::user_sensor_exposure1
property SDK::SCANNERS::RF62X::Params::user_sensor_exposure2
property SDK::SCANNERS::RF62X::Params::user_sensor_exposure3
property SDK::SCANNERS::RF62X::Params::user_sensor_exposure4
property SDK::SCANNERS::RF62X::Params::maxExposure
property SDK::SCANNERS::RF62X::Params::doubleSpeedEnabled
property SDK::SCANNERS::RF62X::Params::edrType
property SDK::SCANNERS::RF62X::Params::edrColumnDivider
```

```
class Streams
```

Property

```
property SDK::SCANNERS::RF62X::Params::udpEnable
property SDK::SCANNERS::RF62X::Params::format
property SDK::SCANNERS::RF62X::Params::includeIntensity
property SDK::SCANNERS::RF62X::Params::pointsCount
```

```
class SysMon
```

Property

```
property SDK::SCANNERS::RF62X::Params::fpgaTemp
property SDK::SCANNERS::RF62X::Params::paramsChanged
property SDK::SCANNERS::RF62X::Params::tempSens00
property SDK::SCANNERS::RF62X::Params::tempSens00Max
property SDK::SCANNERS::RF62X::Params::tempSens00Min
property SDK::SCANNERS::RF62X::Params::tempSens01
property SDK::SCANNERS::RF62X::Params::tempSens01Max
property SDK::SCANNERS::RF62X::Params::tempSens01Min
property SDK::SCANNERS::RF62X::Params::tempSens10
property SDK::SCANNERS::RF62X::Params::tempSens10Max
property SDK::SCANNERS::RF62X::Params::tempSens10Min
property SDK::SCANNERS::RF62X::Params::tempSens11
property SDK::SCANNERS::RF62X::Params::tempSens11Max
property SDK::SCANNERS::RF62X::Params::tempSens11Min
class Trigger

class Counter
```

Property

```
property SDK::SCANNERS::RF62X::Params::type
property SDK::SCANNERS::RF62X::Params::maxValueEnabled
property SDK::SCANNERS::RF62X::Params::maxValue
property SDK::SCANNERS::RF62X::Params::resetTimerEnabled
property SDK::SCANNERS::RF62X::Params::resetTimerValue
property SDK::SCANNERS::RF62X::Params::value
class Sync
```

Property

```
property SDK::SCANNERS::RF62X::Params::source
property SDK::SCANNERS::RF62X::Params::strictEnabled
property SDK::SCANNERS::RF62X::Params::divider
property SDK::SCANNERS::RF62X::Params::delay
```

Пример использования с ключами:

```
{
...Initialize sdk library
...Search for RF627old
}

// Establish connection to the RF627 device by Service Protocol.
Scanners[i].Connect();

// read params from RF627 device by Service Protocol.
Scanners[i].ReadParams();

// Get parameter of Device Name
RF62X.Param<string> name = Scanners[i].GetParam(RF62X.Params.User.General.
↪deviceName);
if (name != null)
{
   string strName = name.GetValue();
   Console.WriteLine("\n\nCurrent Device Name \t: {0}", strName);
}

// Get parameter of Device IP Addr
RF62X.Param<List<uint>> ipAddr = Scanners[i].GetParam(RF62X.Params.User.
↪NetWork.ip);
if (ipAddr != null)
{
   List<uint> ip = ipAddr.GetValue();
   Console.WriteLine("Current Device IP Addr\t: {0}.{1}.{2}.{3}", ip[0],␣
↪ip[1], ip[2], ip[3]);
}

// Get parameter of Laser Enabled
RF62X.Param<uint> laserEnabled = Scanners[i].GetParam(RF62X.Params.User.Laser.
↪enabled);
if (laserEnabled != null)
{
   bool isLaserEnabled = Convert.ToBoolean(laserEnabled.GetValue());
   Console.WriteLine("Current Laser State\t: {0}", isLaserEnabled ? "ON" :
↪"OFF");
}
```

Для более детального описания каждого параметра и его свойств см. *PARAMETERS*

SetParam()

Функция установки конкретного параметра. При вызове данной функции происходит установка передаваемого параметра в локальном списке параметров в SDK. Для отправки изменений в сканер необходимо вызвать функцию `write_params`.

bool SDK.SCANNERS.RF62X.RF627old.SetParam(dynamic param)

Update parameter in internal structure

Return true on success, else - false

Parameters

- `param`: Updated parameter

Пример использования:

```
{
...Initialize sdk library
...Search for RF627old
}

// Establish connection to the RF627 device by Service Protocol.
Scanners[i].Connect();

// read params from RF627 device by Service Protocol.
Scanners[i].ReadParams();

// Get parameter of Device Name
RF62X.Param<string> name = Scanners[i].GetParam(RF62X.Params.User.General.
↪deviceName);
if (name != null)
{
   string strName = name.GetValue();
   Console.WriteLine("\n\nCurrent Device Name \t: {0}", strName);

   // Add "_TEST" to the ending of the current name
   strName += "_TEST";
   name.SetValue(strName);
   Console.WriteLine("New Device Name \t: {0}", strName);
   Console.WriteLine("----------------------------------------");

   Scanners[i].SetParam(name);
}

// Get parameter of Device IP Addr
RF62X.Param<List<uint>> ipAddr = Scanners[i].GetParam(RF62X.Params.User.
↪NetWork.ip);
if (ipAddr != null)
{
   List<uint> ip = ipAddr.GetValue();
   Console.WriteLine("Current Device IP Addr\t: {0}.{1}.{2}.{3}", ip[0],␣
↪ip[1], ip[2], ip[3]);

   // Change last digit of IP address (e.g. 192.168.1.30 -> 192.168.1.31)
   ip[3]++;
   ipAddr.SetValue(ip);
   Console.WriteLine("New Device IP Addr\t: {0}.{1}.{2}.{3}", ip[0], ip[1],␣
↪ip[2], ip[3]);
   Console.WriteLine("----------------------------------------");

   Scanners[i].SetParam(ipAddr);
}

// Get parameter of Laser Enabled
RF62X.Param<uint> laserEnabled = Scanners[i].GetParam(RF62X.Params.User.Laser.
↪enabled);
if (laserEnabled != null)
{
   bool isLaserEnabled = Convert.ToBoolean(laserEnabled.GetValue());
   Console.WriteLine("Current Laser State\t: {0}", isLaserEnabled ? "ON" :
↪"OFF");
```

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(продолжение с предыдущей страницы)

```
    // Change the current state to the opposite
    isLaserEnabled = !isLaserEnabled;
    laserEnabled.SetValue((uint)(Convert.ToUInt32(isLaserEnabled)));
    Console.WriteLine("New Laser State\t\t: {0}", isLaserEnabled ? "ON" : "OFF
↪");
    Console.WriteLine("----------------------------------------");

    Scanners[i].SetParam(laserEnabled);
}

//  Write changes parameters to the device's memory
Scanners[i].WriteParams();
```

WriteParams()

Функция записи локальных параметров из SDK в сканер. При вызове данной функции происходит отправка списка локальных параметров из SDK в сканер.

bool SDK.SCANNERS.RF62X.RF627old.WriteParams(PROTOCOLS_TYPES protocol = PROTOCOLS_
Write current parameters to device's memory

Return true on success

Parameters

- `protocol`: protocol's type (Service Protocol, ENIP, Modbus-TCP)

Пример использования:

```
{
...Initialize sdk library
...Search for RF627old
}

// Establish connection to the RF627 device by Service Protocol.
Scanners[i].Connect();

// read params from RF627 device by Service Protocol.
Scanners[i].ReadParams();

{
...Some steps to change scanner's parameters
}

//  Write changes parameters to the device's memory
Scanners[i].WriteParams();

// Disconnect from scanner.
Scanners[i].Disconnect();
```

ГЛАВА 3

Примеры использования

3.1 Примеры для C++

3.1.1 Поиск устройств RF62X

Ниже приведен пример поиска сканеров серии RF627Old в сети

```
#include <rf62Xsdk.h>
#include <rf62Xtypes.h>
#include <string>
#include <iostream>

using namespace SDK::SCANNERS::RF62X;

int main()
{

   // Initialize sdk library
   sdk_init();

   // Print return rf627 sdk version
   std::cout << "SDK version: " << sdk_version()                << std::endl;
   std::cout << "========================================="     << std::endl;

   // Create value for scanners vector's type
   std::vector<rf627old*> list;
   // Search for RF627old devices over network
   list = rf627old::search(PROTOCOLS::SERVICE);

   // Print count of discovered RF627Old in network by Service Protocol
   std::cout << "Discovered: " << list.size() << " RF627Old"   << std::endl;

   for (size_t i = 0; i < list.size(); i++)
   {
      rf627old::hello_info info = list[i]->get_info();
```

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(продолжение с предыдущей страницы)

```
        std::cout << "\n\n\nID scanner's list: " << i             << std::endl;
        std::cout << "----------------------------------------" << std::endl;
        std::cout << "Device information: "                      << std::endl;
        std::cout << "* Name\t: "     << info.device_name()      << std::endl;
        std::cout << "* Serial\t: "   << info.serial_number()    << std::endl;
        std::cout << "* IP Addr\t: "  << info.ip_address()       << std::endl;
        std::cout << "* MAC Addr\t: " << info.mac_address()      << std::endl;

        std::cout << "\nWorking ranges: "                        << std::endl;
        std::cout << "* Zsmr, mm\t: " << info.z_smr()            << std::endl;
        std::cout << "* Zmr , mm\t: " << info.z_mr()             << std::endl;
        std::cout << "* Xsmr, mm\t: " << info.x_smr()            << std::endl;
        std::cout << "* Xemr, mm\t: " << info.x_emr()            << std::endl;

        std::cout << "\nVersions: "                              << std::endl;
        std::cout << "* Firmware\t: " << info.firmware_version() << std::endl;
        std::cout << "* Hardware\t: " << info.hardware_version() << std::endl;
        std::cout << "----------------------------------------" << std::endl;
    }

    system("pause");
}
```

Ниже приведён результат вывода приложения при успешном обнаружении сканера в сети:

```
SDK version: 1.3.0
========================================
Discovered: 1 RF627Old

ID scanner's list: 0
----------------------------------------
Device information:
* Name      : RF627
* Serial    : 190068
* IP Addr   : 192.168.1.32
* MAC Addr  : 00:0a:35:6e:07:f5

Working ranges:
* Zsmr, mm  : 70
* Zmr , mm  : 50
* Xsmr, mm  : 30
* Xemr, mm  : 42

Versions:
* Firmware  : 19.11.12
* Hardware  : 18.6.20
----------------------------------------
Press any key to continue . . .
```

Вы можете открыть и скомпилировать этот пример с помощью **Qt Creator**:

- Загрузите файл CMakeLists.txt из папки **examples/Cpp/RF627_old/RF627_search** через **File > Open File or Project** (выберите файл CMakeLists.txt)
- Выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
- Запустите проект

3.1.2 Получение профиля сканера

Ниже приведен пример получения профилей от сканеров серии RF627Old

```
#include <rf62Xsdk.h>
#include <rf62Xtypes.h>
#include <string>
#include <iostream>

using namespace SDK::SCANNERS::RF62X;

int main()
{

    // Initialize sdk library
   sdk_init();

   // Print return rf627 sdk version
   std::cout << "SDK version: " << sdk_version()                 << std::endl;
   std::cout << "========================================="      << std::endl;


    // Create value for scanners vector's type
   std::vector<rf627old*> list;
   // Search for RF627old devices over network
   list = rf627old::search(PROTOCOLS::SERVICE);


   // Print count of discovered RF627Old in network by Service Protocol
   std::cout << "Discovered: " << list.size() << " RF627Old"    << std::endl;


   // Iterate over all discovered RF627Old in network, connect to each of
   // them and get a profile.
   for(size_t i = 0; i < scanners.size(); i++)
   {
      rf627old::hello_info info = list[i]->get_info();

      // Print information about the scanner to which the profile belongs.
      std::cout << "\n\n\nID scanner's list: " << i             << std::endl;
      std::cout << "----------------------------------------" << std::endl;
      std::cout << "Device information: "                      << std::endl;
      std::cout << "* Name\t: "     << info.device_name()      << std::endl;
      std::cout << "* Serial\t: "   << info.serial_number()    << std::endl;
      std::cout << "* IP Addr\t: "  << info.ip_address()       << std::endl;

      // Establish connection to the RF627 device by Service Protocol.
      list[i]->connect();

      // Get profile from scanner's data stream by Service Protocol.
      profile2D_t* profile = list[i]->get_profile2D();
      if (profile != nullptr)
      {
         std::cout << "Profile information: "                  << std::endl;
         switch (profile->header.data_type) {
         case (uint8_t)PROFILE_DATA_TYPE::PIXELS:
             std::cout << "* DataType\t: "<< "PIXELS"          << std::endl;
             std::cout << "* Count\t: " << profile->pixels.size()<< std::endl;
```

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(продолжение с предыдущей страницы)

```
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PROFILE:
            std::cout << "* DataType\t: "<< "PROFILE"           << std::endl;
            std::cout << "* Size\t: "  << profile->points.size()<< std::endl;
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PIXELS_INTRP:
            std::cout << "* DataType\t: "<< "PIXELS_INTRP"      << std::endl;
            std::cout << "* Count\t: " << profile->pixels.size()<< std::endl;
            break;
        case (uint8_t)PROFILE_DATA_TYPE::PROFILE_INTRP:
            std::cout << "* DataType\t: "<< "PROFILE_INTRP"     << std::endl;
            std::cout << "* Size\t: "  << profile->points.size()<< std::endl;
            break;
        }
        std::cout << "Profile was successfully received!"       << std::endl;
        std::cout << "----------------------------------------"<< std::endl;
      }else
      {
        std::cout << "Profile was not received!"                << std::endl;
        std::cout << "----------------------------------------"<< std::endl;
      }

   }

   system("pause");
}
```

Ниже приведён результат вывода приложения при успешном получении профиля со сканера:

```
SDK version: 1.3.0
========================================
Discovered: 1 RF627Old


ID scanner's list: 0
----------------------------------------
Device information:
* Name      : RF627
* Serial    : 190068
* IP Addr   : 192.168.1.32
Profile information:
* DataType  : PROFILE
* Size      : 648
Profile was successfully received!
----------------------------------------
Press any key to continue . . .
```

Вы можете открыть и скомпилировать этот пример с помощью **Qt Creator**:

- Загрузите файл CMakeLists.txt из папки **examples/Cpp/RF627_old/RF627_profile** через **File > Open File or Project** (выберите файл CMakeLists.txt)
- Выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
- Запустите проект

3.1.3 Получение и установка параметров

Ниже приведен пример получения и изменения имени сканера, установки IP адреса, смены состояния лазера (включение или отключение):

```
#include <rf62Xsdk.h>
#include <rf62Xtypes.h>
#include <iostream>
#include <string>

using namespace SDK::SCANNERS::RF62X;

int main()
{

   // Initialize sdk library
   sdk_init();

   // Print return rf62X SDK version
   std::cout << "SDK version: " << sdk_version()                    <<␣
↪std::endl;
   std::cout << "========================================"          <<␣
↪std::endl;


   // Create value for scanners vector's type
   std::vector<rf627old*> scanners;
   // Search for RF627old devices over network
   scanners = rf627old::search(PROTOCOLS::SERVICE);


   // Print count of discovered RF627Old in network by Service Protocol
   std::cout << "Discovered: " << scanners.size() << " RF627Old"  <<␣
↪std::endl;


   // Iterate over all discovered RF627Old in network, connect to each of
   // them and read/set parameters.
   for(size_t i = 0; i < scanners.size(); i++)
   {

      rf627old::hello_info info = scanners[i]->get_info();

      std::cout << "\n\n\nID scanner's list: " << i                <<␣
↪std::endl;
      std::cout << "----------------------------------------"     <<␣
↪std::endl;

      // Establish connection to the RF627 device by Service Protocol.
      scanners[i]->connect();

      // read params from RF627 device by Service Protocol.
      scanners[i]->read_params();

      // Get parameter of Device Name
      param_t* name = scanners[i]->get_param(PARAM_NAME_KEY::USER_GENERAL_
↪DEVICENAME);
      if (name->type == param_value_types[(int)PARAM_VALUE_TYPE::STRING_PARAM_
↪TYPE])
```

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(продолжение с предыдущей страницы)

```
    {
        std::string str_name = name->get_value<value_str>();
        std::cout << "Current Device Name \t: " << str_name     << std::endl;

        // Add "_TEST" to the ending of the current name
        str_name += "_TEST";
        name->set_value<value_str>(str_name);
        std::cout << "New Device Name \t: " << str_name         << std::endl;
        std::cout << "----------------------------------------"<< std::endl;

        scanners[i]->set_param(name);
    }

    // Get parameter of Device IP Addr
    param_t* ip_addr = scanners[i]->get_param(PARAM_NAME_KEY::USER_NETWORK_
↪IP);
    if (ip_addr->type == param_value_types[(int)PARAM_VALUE_TYPE::UINT32_
↪ARRAY_PARAM_TYPE])
    {
        std::vector <uint32_t> ip = ip_addr->get_value<array_uint32>();
        std::cout << "Current Device IP\t: ";
        for(auto i: ip) std::cout<<std::to_string(i)<<".";std::cout<
↪<std::endl;

        // Change last digit of IP address (e.g. 192.168.1.30 -> 192.168.1.
↪31)
        ip[3]++;
        ip_addr->set_value<array_uint32>(ip);
        std::cout << "New Device IP\t: ";
        for(auto i: ip) std::cout<<std::to_string(i)<<".";std::cout<
↪<std::endl;
        std::cout << "----------------------------------------"<< std::endl;

        scanners[i]->set_param(ip_addr);
    }

    // Get parameter of Laser Enabled
    param_t* laser_enabled = scanners[i]->get_param(PARAM_NAME_KEY::USER_
↪LASER_ENABLED);
    if (laser_enabled->type == param_value_types[(int)PARAM_VALUE_
↪TYPE::UINT_PARAM_TYPE])
    {
        bool isEnabled = laser_enabled->get_value<value_uint32>();
        std::cout<<"Current Laser State\t: "<<(isEnabled?"ON":"OFF")<
↪<std::endl;

        isEnabled = !isEnabled;
        // Change the current state to the opposite
        laser_enabled->set_value<value_uint32>(!isEnabled);
        std::cout<<"New Laser State\t: "<<(isEnabled?"ON":"OFF")<<std::endl;
        std::cout << "----------------------------------------"<< std::endl;

        scanners[i]->set_param(laser_enabled);
    }

    //  Write changes parameters to the device's memory
    scanners[i]->write_params();
```

(continues on next page)

(продолжение с предыдущей страницы)

```
    }

    system("pause");

}
```

Ниже приведён результат вывода приложения при успешной установке новых параметров:

```
SDK version: 1.3.0
========================================
Discovered: 1 RF627Old


ID scanner's list: 0
----------------------------------------
Current Device Name   : RF627
New Device Name       : RF627_TEST
----------------------------------------
Current Device IP     : 192.168.1.32.
New Device IP         : 192.168.1.33.
----------------------------------------
Current Laser State   : ON
New Laser State       : OFF
----------------------------------------

Press any key to continue . . .
```

Вы можете открыть и скомпилировать этот пример с помощью **Qt Creator**:

- Загрузите файл CMakeLists.txt из папки **examples/Cpp/RF627_old/RF627_params** через **File > Open File or Project** (выберите файл CMakeLists.txt)
- Выберите компилятор (MinGW, MSVC2017, Clang) и нажмите **Configure Project**
- Запустите проект

3.2 Примеры для C#

3.2.1 Поиск устройств RF62X

Ниже приведен пример поиска сканеров серии RF627Old в сети

```
using System;
using System.Collections.Generic;
using SDK.SCANNERS;

namespace RF627_search
{
    class Program
    {
        static void Main(string[] args)
        {

            // Start initialization of the library core
```

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(продолжение с предыдущей страницы)

```
            RF62X.SdkInit();

            // Print return rf62X sdk version
            Console.WriteLine("SDK version: {0}", RF62X.SdkVersion());
            Console.WriteLine("========================================");

            // Search for RF627old devices over network
            Console.WriteLine("- Start searching device");
            List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();
            Console.WriteLine("+ {0} scanners detected", Scanners.Count);

            for (int i = 0; i < Scanners.Count; i++)
            {
               RF62X.HelloInfo info = Scanners[i].GetInfo();

               Console.WriteLine("\n\n\nID scanner's list: {0}", i);
               Console.WriteLine("----------------------------------------");
               Console.WriteLine("Device information: ");
               Console.WriteLine("* Name\t: {0}", info.device_name);
               Console.WriteLine("* Serial\t: {0}", info.serial_number);
               Console.WriteLine("* IP Addr\t: {0}", info.ip_address);
               Console.WriteLine("* MAC Addr\t: {0}", info.mac_address);

               Console.WriteLine("Working ranges: ");
               Console.WriteLine("* Zsmr, mm\t: {0}", info.z_smr);
               Console.WriteLine("* Zmr , mm\t: {0}", info.z_mr);
               Console.WriteLine("* Xsmr, mm\t: {0}", info.x_smr);
               Console.WriteLine("* Xemr, mm\t: {0}", info.x_emr);

               Console.WriteLine("\nVersions: ");
               Console.WriteLine("* Firmware\t: {0}", info.firmware_version);
               Console.WriteLine("* Hardware\t: {0}", info.hardware_version);
               Console.WriteLine("----------------------------------------");
            }

            Console.WriteLine("{0}Press any key to end \"Search-test\"",␣
↪Environment.NewLine);
            Console.ReadKey();

            // Cleanup resources allocated with SdkInit()
            RF62X.SdkCleanup();
        }
    }
}
```

3.2.2 Получение профиля сканера

Ниже приведен пример получения профилей от сканеров серии RF627Old

```
using System;
using System.Collections.Generic;
using SDK.SCANNERS;

namespace RF627_profile
{
```

(continues on next page)

(продолжение с предыдущей страницы)

```
class Program
{
   static void Main(string[] args)
   {

      // Start initialization of the library core
      RF62X.SdkInit();


      // Search for RF627old devices over network
      Console.WriteLine("- Start searching device");
      List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();
      Console.WriteLine("+ {0} scanners detected", Scanners.Count);


      // foreach over an scanners list
      for (int i = 0; i < Scanners.Count; i++)
      {
         RF62X.HelloInfo info = Scanners[i].GetInfo();

         Console.WriteLine("\n\n\nID scanner's list: {0}", i);
         Console.WriteLine("----------------------------------------");
         Console.WriteLine("Device information: ");
         Console.WriteLine("* Name\t: {0}", info.device_name);
         Console.WriteLine("* Serial\t: {0}", info.serial_number);
         Console.WriteLine("* IP Addr\t: {0}", info.ip_address);

         // Establish connection to the RF627 device by Service Protocol.
         Scanners[i].Connect();

         // Get profile from scanner's data stream by Service Protocol.
         RF62X.Profile profile = Scanners[i].GetProfile();
         if (profile.header != null)
         {
            Console.WriteLine("Profile information: ");
            switch (profile.header.data_type)
            {
               case RF62X.PROFILE_TYPE.PIXELS_NORMAL:
                  Console.WriteLine("* DataType\t: PIXELS");
                  Console.WriteLine("* Count\t: {0}", profile.pixels.
↪Count);
                  break;
               case RF62X.PROFILE_TYPE.PROFILE_NORMAL:
                  Console.WriteLine("* DataType\t: PROFILE");
                  Console.WriteLine("* Size\t: {0}", profile.points.Count);
                  break;
               case RF62X.PROFILE_TYPE.PIXELS_INTERPOLATED:
                  Console.WriteLine("* DataType\t: PIXELS");
                  Console.WriteLine("* Count\t: {0}", profile.pixels.
↪Count);
                  break;
               case RF62X.PROFILE_TYPE.PROFILE_INTERPOLATED:
                  Console.WriteLine("* DataType\t: PROFILE");
                  Console.WriteLine("* Size\t: {0}", profile.points.Count);
                  break;
               default:
                  break;
```

(continues on next page)

(продолжение с предыдущей страницы)

```
                }
                Console.WriteLine("Profile was successfully received!");
                Console.WriteLine("----------------------------------------");
            }else
            {
                Console.WriteLine("Profile was not received!");
                Console.WriteLine("----------------------------------------");
            }

            // Disconnect from scanner.
            Scanners[i].Disconnect();
        }

        Console.WriteLine("{0}Press any key to end \"Search-test\"",␣
↪Environment.NewLine);
        Console.ReadKey();

        // Cleanup resources allocated with SdkInit()
        RF62X.SdkCleanup();
    }
  }
}
```

3.2.3 Получение и установка параметров

Ниже приведен пример получения и изменения имени сканера, установки IP адреса, смены состояния лазера (включение или отключение):

```
using System;
using System.Collections.Generic;
using SDK.SCANNERS;

namespace RF627_params
{
   class Program
   {
      static void Main(string[] args)
      {

         // Start initialization of the library core
         RF62X.SdkInit();

         // Search for RF627old devices over network
         Console.WriteLine("- Start searching device");
         List<RF62X.RF627old> Scanners = RF62X.RF627old.Search();
         Console.WriteLine("+ {0} scanners detected", Scanners.Count);

         // foreach over an scanners list
         for (int i = 0; i < Scanners.Count; i++)
         {
            // Establish connection to the RF627 device by Service Protocol.
            Scanners[i].Connect();

            // read params from RF627 device by Service Protocol.
            Scanners[i].ReadParams();
```

(continues on next page)

(продолжение с предыдущей страницы)

```
            // Get parameter of Device Name
            RF62X.Param<string> name = Scanners[i].GetParam(RF62X.Params.User.
↪General.deviceName);
            if (name != null)
            {
                string strName = name.GetValue();
                Console.WriteLine("\n\nCurrent Device Name \t: {0}", strName);

                // Add "_TEST" to the ending of the current name
                strName += "_TEST";
                name.SetValue(strName);
                Console.WriteLine("New Device Name \t: {0}", strName);
                Console.WriteLine("----------------------------------------");

                Scanners[i].SetParam(name);
            }

            // Get parameter of Device IP Addr
            RF62X.Param<List<uint>> ipAddr = Scanners[i].GetParam(RF62X.
↪Params.User.NetWork.ip);
            if (ipAddr != null)
            {
                List<uint> ip = ipAddr.GetValue();
                Console.WriteLine("Current Device IP Addr\t: {0}.{1}.{2}.{3}",␣
↪ip[0], ip[1], ip[2], ip[3]);

                // Change last digit of IP address (e.g. 192.168.1.30 -> 192.
↪168.1.31)
                ip[3]++;
                ipAddr.SetValue(ip);
                Console.WriteLine("New Device IP Addr\t: {0}.{1}.{2}.{3}",␣
↪ip[0], ip[1], ip[2], ip[3]);
                Console.WriteLine("----------------------------------------");

                Scanners[i].SetParam(ipAddr);
            }

            // Get parameter of Laser Enabled
            RF62X.Param<uint> laserEnabled = Scanners[i].GetParam(RF62X.
↪Params.User.Laser.enabled);
            if (laserEnabled != null)
            {
                bool isLaserEnabled = Convert.ToBoolean(laserEnabled.
↪GetValue());
                Console.WriteLine("Current Laser State\t: {0}", isLaserEnabled␣
↪? "ON" : "OFF");

                // Change the current state to the opposite
                isLaserEnabled = !isLaserEnabled;
                laserEnabled.SetValue((uint)(Convert.
↪ToUInt32(isLaserEnabled)));
                Console.WriteLine("New Laser State\t\t: {0}", isLaserEnabled ?
↪"ON" : "OFF");
                Console.WriteLine("----------------------------------------");

                Scanners[i].SetParam(laserEnabled);
```

(continues on next page)

(продолжение с предыдущей страницы)

```
            }

            //  Write changes parameters to the device's memory
            Scanners[i].WriteParams();

            // Disconnect from scanner.
            Scanners[i].Disconnect();
        }
        Console.WriteLine("{0}Press any key to end \"Parameters-test\"",␣
↪Environment.NewLine);
        Console.ReadKey();

        // Cleanup resources allocated with SdkInit()
        RF62X.SdkCleanup();
    }
  }
}
```

3.3 Примеры для PYTHON

3.3.1 Поиск устройств RF62X

Ниже приведен пример поиска сканеров серии RF627Old в сети

3.3.2 Получение профиля сканера

Ниже приведен пример получения профилей от сканеров серии RF627Old

3.3.3 Получение и установка параметров

Ниже приведен пример получения и изменения имени сканера, установки IP адреса, смены состояния лазера (включение или отключение):

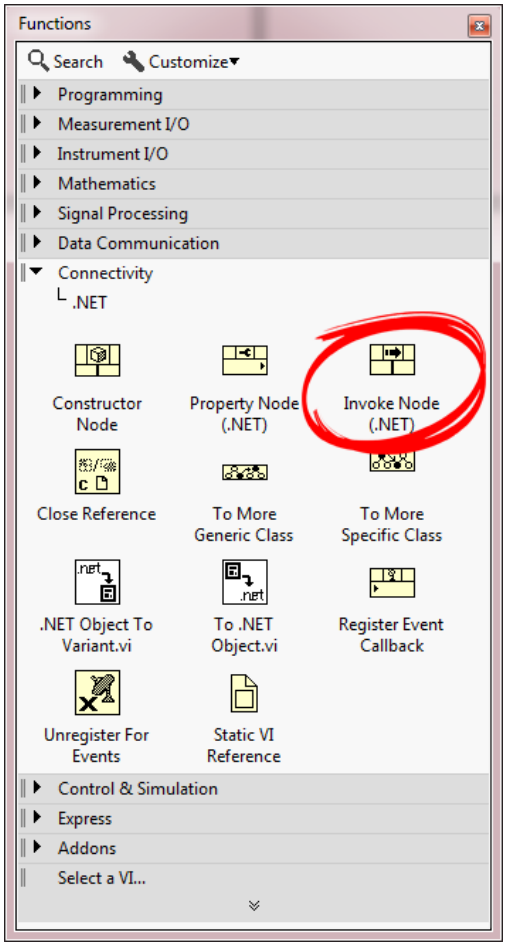
3.4 Примеры для LabVIEW

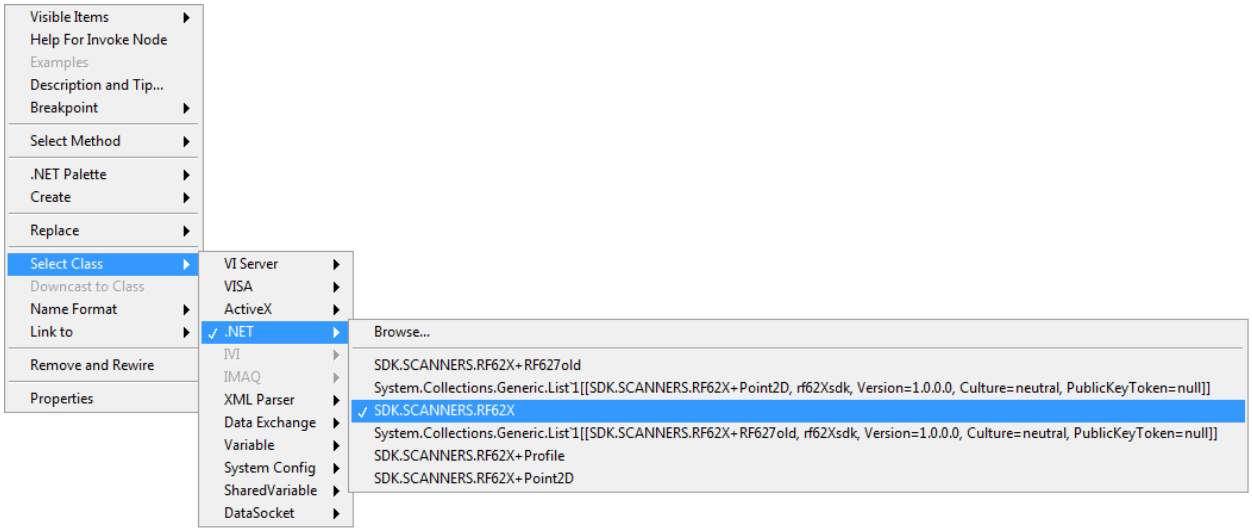
3.4.1 Настройка среды

Перед созданием приложений в IDE LabVIEW для работы с лазерными сканерами серии RF62X необходимо:

1) В папку с проектом LabVIEW добавить **две библиотеки**: - основную библиотеку **rf62Xcore.dll** (см. *Компиляция «ядра» на C*) - библиотеку-«обёртку» **rf62Xsdk.dll** для .NET, написанную на языке C# (см. *Компиляция «обёртки» на C#*)

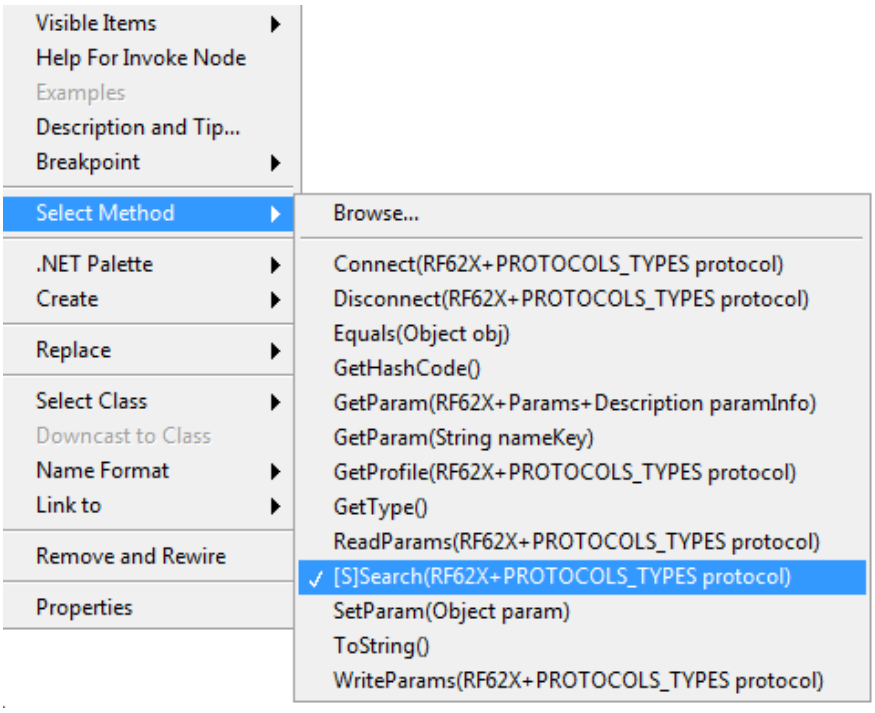
2) Для вызовов методов из **rf62Xsdk.dll** при проектировании алгоритмом в LabVIEW необходим компонент **Invoke Node (.Net)**, который располагается в разделе **Connectivity->.Net**


Functions
Search
Customize
Programming
Measurement I/O
Instrument I/O
Mathematics
Signal Processing
Data Communication
Connectivity
.NET
Constructor Node
Property Node (.NET)
Invoke Node (.NET)
Close Reference
To More Generic Class
To More Specific Class
.NET Object To Variant.vi
To .NET Object.vi
Register Event Callback
Unregister For Events
Static VI Reference
Control & Simulation
Express
Addons
Select a VI...


Visible Items
Help For Invoke Node
Examples
Description and Tip...
Breakpoint
Select Method
.NET Palette
Create
Replace
Select Class
Downcast to Class
Name Format
Link to
Remove and Rewire
Properties
VI Server
VISA
ActiveX
.NET
IVI
IMAQ
XML Parser
Data Exchange
Variable
System Config
SharedVariable
DataSocket
Browse...
SDK.SCANNERS.RF62X+RF627old
System.Collections.Generic.List`1[[SDK.SCANNERS.RF62X+Point2D, rf62Xsdk, Version=1.0.0.0, Culture=neutral, PublicKeyToken=null]]
SDK.SCANNERS.RF62X
System.Collections.Generic.List`1[[SDK.SCANNERS.RF62X+RF627old, rf62Xsdk, Version=1.0.0.0, Culture=neutral, PublicKeyToken=null]]
SDK.SCANNERS.RF62X+Profile
SDK.SCANNERS.RF62X+Point2D

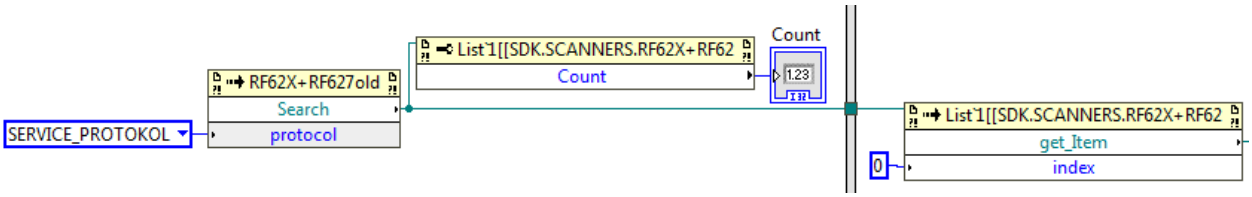
3) В контекстном меню добавленного компонента **Invoke Node (.Net)** необходимо указать библиотеку **rf62Xsdk.dll** и выбрать класс **SDK.SCANNERS.RF62X**:

4) Для вызова в IDE LabVIEW конкретного метода из библиотеки **rf62Xsdk.dll** необходимо в контекстном меню добавленного компонента **Invoke Node (.Net)** открыть раздел **Class Method**:



3.4.2 Поиск устройств RF62X

Ниже приведен пример поиска сканеров серии RF627Old в сети



3.4.3 Получение профиля сканера

Ниже приведен пример получения профилей от сканеров серии RF627Old

3.4.4 Получение и установка параметров

Ниже приведен пример получения и изменения имени сканера, установки IP адреса, смены состояния лазера (включение или отключение):

3.5 Примеры для MatLab

3.5.1 Поиск устройств RF62X

Ниже приведен пример поиска сканеров серии RF627Old в сети

```
clc
dll_in_matlab = NET.addAssembly('rf62Xsdk.dll');
dll_in_matlab.Classes

clc;
import SDK.SCANNERS.*
import SDK.SCANNERS.RF62X.*
import SDK.SCANNERS.RF62X+RF627old.*
import System.Collections.Generic.*

% Initialize sdk library
RF62X.SdkInit();

% Print return rf62X sdk version
RF62X.SdkVersion()

% Search for RF627old devices over network
list=Search()

% Cleanup resources allocated with SdkInit()
RF62X.SdkCleanup()
```

3.5.2 Получение профиля сканера

Ниже приведен пример получения профилей от сканеров серии RF627Old

3.5.3 Получение и установка параметров

Ниже приведен пример получения и изменения имени сканера, установки IP адреса, смены состояния лазера (включение или отключение):

Документация	www.riftek.com
Website	www.riftek.com
Версия документа	1.4.0 от 20/05/2020
Версии библиотеки	1.4.0 от 20/05/2020

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