

KOWAParser

KowaProtocolParser C++ library

v1.0.0

Table of contents

- [Overview](#)
- [Versions](#)
- [Library files](#)
- [KowaProtocolParser class description](#)
 - [Class declaration](#)
 - [getVersion method](#)
 - [getCommand method](#)
- [KowaSC200PK1CCommand enum](#)
- [Build and connect to your project](#)

Overview

KowaProtocolParser C++ library designed to encode (prepare) control commands for low-light [KOWA camera](#). The library includes method for preparing commands (encoding). It uses C++17 standard and compatible with any Windows and Linux. The library provides simple interface and doesn't have third party dependencies to be installed in OS. Also, the library provides test application to control camera via serial port. Test application depends on open source [SerialPort](#) (provides methods to work with serial ports, source code included, Apache 2.0 license).

Versions

Table 1 - Library versions.

| Version | Release date | What's new |
|---------|--------------|----------------|
| 1.0.0 | 07.03.2024 | First version. |

Library files

The library supplied by source code only. The user would be given a set of files in the form of a CMake project (repository). The repository structure is shown below:

```
CMakeLists.txt ----- Main CMake file.
src ----- Folder with library source code.
  CMakeLists.txt ----- CMake file.
  KowaProtocolParser.h ----- Main library header file.
  KowaProtocolParser.cpp ----- C++ implementation file.
  KowaProtocolParserVersion.h ----- Header file with library version.
  KowaProtocolParserVersion.h.in ---- File for CMake to generate version header.
test ----- Folder for test application files.
  3rdparty ----- Folder with 3rdparty libraries for test
  application.
    CMakeLists.txt ----- CMake file for to include 3rdparty libraries.
    SerialPort ----- Folder with SerialPort library.
  CMakeLists.txt ----- CMake file for test application.
  main.cpp ----- Source C++ file of test application.
```

KowaProtocolParser class description

Class declaration

KowaProtocolParser.h file contains **KowaProtocolParser** class declaration.

```
class KowaProtocolParser
{
public:

  /// Get library version.
  static std::string getVersion();

  /// Method to encode Kowa camera command.
  bool getCommand(uint8_t* data,
                 int& size,
                 KowaSC200PK1CCommand id,
                 int cameraId = 0x31,
                 int arg1 = 0,
                 int arg2 = 0);
}
```

getVersion method

The **getVersion()** method returns string of current version of **KowaProtocolParser** class. Method declaration:

```
static std::string getVersion();
```

Method can be used without **KowaProtocolParser** class instance. Example:

```
cout << "KowaProtocolParser version: " << KowaProtocolParser::getVersion() << endl;
```

Console output:

```
KowaProtocolParser version: 1.0.0
```

getCommand method

The **getCommand(...)** method encodes (prepares data) control command for camera. Method declaration:

```
bool getCommand(uint8_t* data, int& size, KowaSC200PK1CCommand id,  
                int cameraId = 0x31, int arg1 = 0, int arg2 = 0);
```

| Parameter | Description |
|-----------|--|
| data | Pointer to buffer for encoded data. |
| size | Size of encoded command. |
| id | Command ID according to KowaSC200PK1CCommand enum. |
| cameraId | Camera ID. Default 0x31. |
| arg1 | First command argument. The value of argument depends on command ID (KowaSC200PK1CCommand enum). Some commands don't have arguments. |
| arg2 | Second command argument. The value of argument depends on command ID (KowaSC200PK1CCommand enum). Some commands don't have arguments. |

Returns: TRUE if command is prepared or FALSE if not.

Example how to encode command:

```
uint8_t command[32];  
int size = 0;  
KowaProtocolParser parser;  
if (!parser.getCommand(command, size, KowaSC200PK1CCommand::DIGITAL_ZOOM, 0x31, 20))  
    cout << " ERROR: Can't encode command" << endl;
```

KowaSC200PK1CCommand enum

```
enum class KowaSC200PK1CCommand
{
    /// Display mode. Command arguments:
    /// arg1: 0 - OFF.
    ///      1 - ON.
    DISPLAY_MODE = 1,
    /// Position. Command arguments:
    /// arg1 - horizontal 0(left) to 255(right).
    /// arg2 - vertical 0(top) to 255(bottom).
    POSITION,
    /// ALC mode. Command arguments:
    /// arg1: 0 - OFF.
    ///      1 - S/N.
    ///      2 - STD.
    ///      3 - MOVE.
    ///      4 - MANUAL.
    ALC_MODE,
    /// Long shutter mode. Command arguments:
    /// arg1: 0 - x1.
    ///      1 - x2.
    ///      2 - x4.
    ///      3 - x8.
    ///      4 - x16.
    LONG_SHUTTER_MODE,
    /// Fast shutter mode. Command arguments:
    /// arg1: 0 - OFF.
    ///      1 - 1/125.
    ///      2 - 1/250.
    ///      3 - 1/500.
    ///      4 - 1/1000.
    ///      5 - 1/2000.
    ///      6 - 1/4000.
    ///      7 - 1/10000.
    ///      8 - 1/50.
    ///      9 - 1/60.
    FAST_SHUTTER_MODE,
    /// Auto level. Command arguments:
    /// arg1 - 0(dark) to 31(bright).
    AUTO_LEVEL,
    /// Gain mode. Command arguments:
    /// arg1: 0 - AGC.
    ///      1 - H AGC.
    ///      2 - MANUAL.
    /// You can change to MANUAL only when IR cut filter changing mode is
    /// COLOR or B/W and ALC mode is OFF or MANUAL.
    GAIN_MODE,
    /// Flicker less. Command arguments:
    /// arg1: 0 - OFF.
    ///      1 - ON.
    FLICKER_LESS_MODE,
    /// BLC mode. Command arguments:
```

```

/// arg1: 0 - OFF.
///      1 - ON.
///      2 - SPOT.
BLC_MODE,
/// white balance mode. Command arguments:
/// arg1: 0 - ATW1.
///      1 - ATW2.
///      2 - AWC.
///      3 - MANUAL.
///      4 - AWC exec.
WHITE_BALANCE_MODE,
/// white balance gain for manual mode. Command arguments:
/// arg1 - RED 0-255.
/// arg2 - BLUE 0-255.
WHITE_BALANCE_GAIN_FOR_MANUAL_MODE,
/// IR cut filter changing mode. Command arguments:
/// arg1: 0 - AUTO.
///      1 - REMOTE.
///      2 - COLOR.
///      3 - B/W.
CHANGING_MODE,
/// IR cut filter changing level. Command arguments:
/// arg1: 0 - DARK.
///      1 - MID.
///      2 - BRIGHT.
///      3 - MANUAL.
CHANGING_LEVEL,
/// Remote control polarity for REMOTE mode. Command arguments:
/// arg1: 0 - MAKE.
///      1 - BREAK.
REMOTE_CONTROL_POLARITY,
/// Changing level for manual mode. Command arguments:
/// arg1 - from color to B/W from 40 to 215.
/// arg2 - from B/W to color mode from 40 to 215.
CHANGING_LEVEL_FOR_MANUAL_MODE,
/// Chroma level. Command arguments:
/// arg1 - level from 0 to 255.
CHROMA_LEVEL,
/// Detail. Command arguments:
/// arg1 - 0(weak) to 15(strong).
DETAIL,
/// Black level. Command arguments:
/// arg1 - 0(dark) to 24(bright).
BLACK_LEVEL,
/// Gamma. Command arguments:
/// arg1: 0 - 0.45.
///      1 - 0.75.
///      2 - 1.0.
GAMMA,
/// DNR mode. Command arguments:
/// arg1: 0 - OFF.
///      1 - LOW.
///      2 - HIGH.
DNR_MODE,
/// Defog mode. Command arguments:
/// arg1: 0 - OFF.

```

```

///      1 - LOW.
///      2 - MIDDLE.
///      3 - HIGH.
DEFOG_MODE,
/// wide dynamic range mode. Command arguments:
/// arg1: 0 - OFF.
///      1 - WDR.
///      2 - Auto Knee.
///      3 - Black Stretch.
WDR_MODE,
/// Color matrix. Command arguments:
/// arg1: Hue:
///      0 - RED.
///      1 - GREEN.
///      2 - BLUE.
///      3 - YELLOW.
///      4 - CYAN.
///      5 - MAGENTA.
///      Saturation:
///      6 - RED.
///      7 - GREEN.
///      8 - BLUE.
///      9 - YELLOW.
///     10 - CYAN.
///     11 - MAGENTA.
/// arg2 - For Hue: 0(small) to 255(big).
///      For saturation 0(-) to 255(+).
COLOR_MATRIX,
/// HD SDI format. Command arguments:
/// arg1: 0 - 1080/59.94i.
///      1 - 1080/29.97p.
///      2 - 720/59.94p.
///      3 - 720/29.97p.
///      4 - 1080/30p.
///      5 - 720/60p.
///      6 - 720/30p.
///      7 - 1080/50i.
///      8 - 1080/25p.
///      9 - 720/50p.
///     10 - 720/25p.
HD_SDI_FORMAT,
/// SDTV format. Command arguments:
/// arg1: 0 - NTSC-J 0.0IRE.
///      1 - NTSC-M (7.5IRE).
///      2 - PAL-B (0.0IRE).
SDTV_FORMAT,
/// SDTV aspect. Command arguments:
/// arg1: 0 - Side cut.
///      1 - Letter box.
///      2 - Squeeze.
SDTV_ASPECT,
/// SDTV color brush. Command arguments:
/// arg1: 0 - Color brush off.
///      1 - Color brush on.
SDTV_COLOR_BRUSH_MODE,
/// Genlock mode. Command arguments:

```

```

/// arg1: 0 - OFF.
///      1 - ON.
GENLOCK_MODE,
/// Genlock horizontal phase adjustment. Command arguments:
/// arg1 - 0 to 255.
GENLOCK_HORIZONTAL_PHASE_ADJUSTMENT,
/// Digital zoom. Command arguments:
/// arg1 - 10(x1.0) to 100(x10.0).
DIGITAL_ZOOM,
/// Flip and mirror. Command arguments:
/// arg1: 0 - Normal.
///      1 - Mirror.
///      2 - Flip.
///      3 - Flip and mirror.
FLIP_AND_MIRROR,
/// Manual gain. Command arguments:
/// arg1 - 0 to 4095.
/// Only for Gain mode=MANUAL
/// The number is dB value timed 10 (0.3dB pitch)
/// 0.0[dB]: 0 = 0x000.
/// 30.0[dB]: 300 = 0x12C.
/// 72.0[dB]: 720 = 0x2D0.
MANUAL_GAIN,
/// Iris speed. Command arguments:
/// arg1: 0 - Normal.
///      1 - x2.0(slowest).
///      2 - x1.8.
///      3 - x1.5.
///      4 - x1.2.
///      5 - x0.9.
///      6 - x0.7.
///      7 - x0.5.
///      8 - x0.2(fastest).
IRIS_SPEED,
/// Base shutter speed. Command arguments.
/// arg1: 0 - OFF.
///      1 - 1/125.
///      2 - 1/250.
///      3 - 1/500.
///      4 - 1/1000.
///      5 - 1/2000.
///      6 - 1/4000.
///      7 - 1/10000.
///      8 - 1/50.
///      9 - 1/60.
BASED_SHUTTER_SPEED,
/// High speed shutter limit. Command arguments:
/// arg1: 0 - OFF.
///      1 - 1/125.
///      2 - 1/250.
///      3 - 1/500.
///      4 - 1/1000.
///      5 - 1/2000.
///      6 - 1/4000.
///      7 - 1/10000.
///      8 - 1/50.

```

```

    ///      9 - 1/60.
    HIGH_SPEED_SHUTTER_LIMIT,
    /// Save. Send SAVE command otherwise the parameters set by remote
    /// control is canceled after power off/on.
    SAVE,
    /// Cancel.
    CANCEL,
    /// Reset to default.
    RESET,
    /// Product name request.
    REQUEST_PRODUCT_NAME,
    /// Main version request.
    REQUEST_MAIN_VERSION,
    /// Firmware version request.
    REQUEST_FIRMWARE,
    /// FPGA version request.
    REQUEST_FPGA_VERSION,
    /// Menu On.
    MENU_ON,
    /// Menu Off.
    MENU_OFF,
    /// Menu enter key.
    MENU_ENTER_KEY,
    /// Menu left key.
    MENU_LEFT_KEY,
    /// Menu right key.
    MENU_RIGHT_KEY,
    /// Menu down key.
    MENU_DOWN_KEY,
    /// Menu up key.
    MENU_UP_KEY
};

```

Table 2 - KowaSC200PK1CCommand enum class description.

| Parameter | Description | Argument 1 | Argument 2 |
|-------------------|-------------------|--|--------------------------------------|
| DISPLAY_MODE | Display mode | 0 - OFF. 1 - ON. | Not used. |
| POSITION | Position | horizontal 0 (left) to 255 (right). | vertical 0 (top) to 255 (bottom). |
| ALC_MODE | ALC mode | 0 - OFF. 1 - S/N. 2 - STD. 3 - MOVE. 4 - MANUAL. | Not used. |
| LONG_SHUTTER_MODE | Long shutter mode | 0 - x1. 1 - x2. 2 - x4. 3 - x8. 4 - x16. | Not used. |

| Parameter | Description | Argument 1 | Argument 2 |
|------------------------------------|---|---|--|
| FAST_SHUTTER_MODE | Fast shutter mode | 0 - OFF. 1 - 1/125. 2 - 1/250. 3 - 1/500. 4 - 1/1000. 5 - 1/2000. 6 - 1/4000. 7 - 1/10000. 8 - 1/50. 9 - 1/60. | Not used. |
| AUTO_LEVEL | Auto level | 0 (dark) to 31(bright). | Not used. |
| GAIN_MODE | Gain mode | 0 - AGC. 1 - H AGC. 2 - MANUAL. | Not used. |
| FLICKER_LESS_MODE | Flicker less | 0 - OFF. 1 - ON. | Not used. |
| BLC_MODE | BLC mode | 0 - OFF. 1 - ON. 2 - SPOT. | Not used. |
| WHITE_BALANCE_MODE | White balance mode | 0 - ATW1. 1 - ATW2. 2 - AWC. 3 - MANUAL. 4 - AWC exec. | Not used. |
| WHITE_BALANCE_GAIN_FOR_MANUAL_MODE | White balance gain for manual mode | RED 0-255. | BLUE 0-255. |
| CHANGING_MODE | IR cut filter changing mode | 0 - AUTO. 1 - REMOTE. 2 - COLOR. 3 - B/W. | Not used. |
| CHANGING_LEVEL | IR cut filter changing level | 0 - DARK. 1 - MID. 2 - BRIGHT. 3 - MANUAL. | Not used. |
| REMOTE_CONTROL_POLARITY | Remote control polarity for REMOTE mode | 0 - MAKE. 1 - BREAK. | Not used. |
| CHANGING_LEVEL_FOR_MANUAL_MODE | Changing level for manual mode | From color to B/W from 40 to 215. | From B/W to color mode from 40 to 215. |
| CHROMA_LEVEL | Chroma level | level from 0 to 255. | Not used. |
| DETAIL | Detail | 0 (weak) to 15 (strong). | Not used. |
| BLACK_LEVEL | Black level | 0 (dark) to 24 (bright). | Not used. |

| Parameter | Description | Argument 1 | Argument 2 |
|-----------------------|-------------------------|--|---|
| GAMMA | Gamma | 0 - 0.45. 1 - 0.75. 2 - 1.0. | Not used. |
| DNR_MODE | DNR mode | 0 - OFF. 1 - LOW. 2 - HIGH. | Not used. |
| DEFOG_MODE | Defog mode | 0 - OFF. 1 - LOW. 2 - MIDDLE. 3 - HIGH. | Not used. |
| WDR_MODE | Wide dynamic range mode | 0 - OFF. 1 - WDR. 2 - Auto Knee. 3 - Black Stretch. | Not used. |
| COLOR_MATRIX | Color matrix | Hue: 0 - RED. 1 - GREEN. 2 - BLUE. 3 - YELLOW. 4 - CYAN. 5 - MAGENTA. Saturation: 6 - RED. 7 - GREEN. 8 - BLUE. 9 - YELLOW. 10 - CYAN. 11 - MAGENTA. | For Hue: 0 (small) to 255 (big). For saturation 0 (-) to 255 (+). |
| HD_SDI_FORMAT | HD SDI format | 0 - 1080/59.94i. 1 - 1080/29.97p. 2 - 720/59.94p. 3 - 720/29.97p. 4 - 1080/30p. 5 - 720/60p. 6 - 720/30p. 7 - 1080/50i. 8 - 1080/25p. 9 - 720/50p. 10 - 720/25p. | Not used. |
| SDTV_FORMAT | SDTV format | 0 - NTSC-J 0.0IRE. 1 - NTSC-M (7.5IRE). 2 - PAL-B (0.0IRE). | Not used. |
| SDTV_ASPECT | SDTV aspect | 0 - Side cut. 1 - Letter box. 2 - Squeeze. | Not used. |
| SDTV_COLOR_BRUSH_MODE | SDTV color brush | 0 - Color brush off. 1 - Color brush on. | Not used. |

| Parameter | Description | Argument 1 | Argument 2 |
|-------------------------------------|---|---|------------|
| GENLOCK_MODE | Genlock mode | 0 - OFF. 1 - ON. | Not used. |
| GENLOCK_HORIZONTAL_PHASE_ADJUSTMENT | Genlock horizontal phase adjustment | 0 to 255. | Not used. |
| DIGITAL_ZOOM | Digital zoom | 10 (x1.0) to 100 (x10.0) | Not used. |
| FLIP_AND_MIRROR | Flip and mirror | 0 - Normal. 1 - Mirror. 2 - Flip. 3 - Flip and mirror. | Not used. |
| MANUAL_GAIN | Manual gain. Only for Gain mode=MANUAL. The number is dB value timed 10 (0.3dB pitch) | 0 to 4095. | Not used. |
| IRIS_SPEED | Iris speed | 0 - Normal. 1 - x2.0(slowest). 2 - x1.8. 3 - x1.5. 4 - x1.2. 5 - x0.9. 6 - x0.7. 7 - x0.5. 8 - x0.2(fastest). | Not used. |
| BASED_SHUTTER_SPEED | Base shutter speed | 0 - OFF. 1 - 1/125. 2 - 1/250. 3 - 1/500. 4 - 1/1000. 5 - 1/2000. 6 - 1/4000. 7 - 1/10000. 8 - 1/50. 9 - 1/60. | Not used. |
| HIGH_SPEED_SHUTTER_LIMIT | High speed shutter limit | 0 - OFF. 1 - 1/125. 2 - 1/250. 3 - 1/500. 4 - 1/1000. 5 - 1/2000. 6 - 1/4000. 7 - 1/10000. 8 - 1/50. 9 - 1/60. | Not used. |
| SAVE | Save | Not used. | Not used. |
| CANCEL | Cancel | Not used. | Not used. |
| RESET | Reset to default | Not used. | Not used. |
| REQUEST_PRODUCT_NAME | Product name request | Not used. | Not used. |
| REQUEST_MAIN_VERSION | Main version request | Not used. | Not used. |

| Parameter | Description | Argument 1 | Argument 2 |
|----------------------|--------------------------|------------|------------|
| REQUEST_FIRMWARE | Firmware version request | Not used. | Not used. |
| REQUEST_FPGA_VERSION | FPGA version request | Not used. | Not used. |
| MENU_ON | Menu On | Not used. | Not used. |
| MENU_OFF | Menu Off | Not used. | Not used. |
| MENU_ENTER_KEY | Menu enter key | Not used. | Not used. |
| MENU_LEFT_KEY | Menu left key | Not used. | Not used. |
| MENU_RIGHT_KEY | Menu right key | Not used. | Not used. |
| MENU_DOWN_KEY | Menu down key | Not used. | Not used. |
| MENU_UP_KEY | Menu up key | Not used. | Not used. |

Build and connect to your project

Typical commands to build **KowaProtocolParser** library:

```
cd KowaProtocolParser
git submodule update --init --recursive
mkdir build
cd build
cmake ..
make
```

If you want to connect **KowaProtocolParser** library to your CMake project as source code, you can do the following. For example, if your repository has structure:

```
CMakeLists.txt
src
  CMakeList.txt
  yourLib.h
  yourLib.cpp
```

Create **3rdparty** folder in your repository and copy folder of **KowaProtocolParser** repository there. The new structure of your repository will be as follows:

```
CMakeLists.txt
src
  CMakeList.txt
  yourLib.h
  yourLib.cpp
3rdparty
  KowaProtocolParser
```

Create CMakeLists.txt file in **3rdparty** folder. CMakeLists.txt should be containing:

```
cmake_minimum_required(VERSION 3.13)
```

```
#####
## 3RD-PARTY
## dependencies for the project
#####
project(3rdparty LANGUAGES CXX)

#####
## SETTINGS
## basic 3rd-party settings before use
#####
# To inherit the top-level architecture when the project is used as a submodule.
SET(PARENT ${PARENT}_YOUR_PROJECT_3RDPARTY)
# Disable self-overwriting of parameters inside included subdirectories.
SET(${PARENT}_SUBMODULE_CACHE_OVERWRITE OFF CACHE BOOL "" FORCE)

#####
## CONFIGURATION
## 3rd-party submodules configuration
#####
SET(${PARENT}_SUBMODULE_KOWA_PROTOCOL_PARSER ON CACHE BOOL "" FORCE)
if (${PARENT}_SUBMODULE_KOWA_PROTOCOL_PARSER)
    SET(${PARENT}_KOWA_PROTOCOL_PARSER ON CACHE BOOL "" FORCE)
    SET(${PARENT}_KOWA_PROTOCOL_PARSER_TEST OFF CACHE BOOL "" FORCE)
endif()

#####
## INCLUDING SUBDIRECTORIES
## Adding subdirectories according to the 3rd-party configuration
#####
if (${PARENT}_SUBMODULE_KOWA_PROTOCOL_PARSER)
    add_subdirectory(KowaProtocolParser)
endif()
```

File **3rdparty/CMakeLists.txt** adds folder **KowaProtocolParser** to your project and excludes test applications and examples from compiling. The new structure of your repository will be:

```
CMakeLists.txt
src
  CMakeList.txt
  yourLib.h
  yourLib.cpp
3rdparty
  CMakeLists.txt
  KowaProtocolParser
```

Next, you need to include the '3rdparty' folder in the main **CMakeLists.txt** file of your repository. Add the following string at the end of your main **CMakeLists.txt**:

```
add_subdirectory(3rdparty)
```

Next, you have to include **KowaProtocolParser** library in your **src/CMakeLists.txt** file:

```
target_link_libraries(${PROJECT_NAME} KowaProtocolParser)
```

Done!