CDC

Implementation in IQRF USB devices

User's guide

Smarter wireless. Simply.

CDC class

Unlike the Custom class, the CDC class provides a simpler serial bus via USB interface. A device equipped with the firmware supporting CDC creates a virtual serial port enabling to communicate with PC or another equipment (supporting USB) via the USB interface like through a standard COM port.

Prior to CDC usage, the IQRF USB CDC driver must be installed. It is available to download from www.iqrf.org/cdc within the WinUSB and MPUSB drivers installators. For all current IQRF USB devices the WinUSB should be selected. CDC driver is also installed within the IQRF IDE 4 development environment installation. This driver uses VID/ PID by MICRORISC when used with IQRF devices.

IQRF kits working with IQRF IDE 4 use the Custom class but can be switched to/from the CDC class by the IQRF IDE 4 (if the kit is equipped with the CDC option).

TIP

For testing a communication in CDC mode various SW terminals operating with PC serial ports are available. Select a terminal enabling to issue direct byte commands and data. Recommended terminal: Docklight, www.docklight.de. There is a project containing all supported commands for this terminal available at www.iqrf.org/218. It is necessary just to select the COM port used.

Unsuitable terminals: Windows Hyperterminal, Tera Term, …

This document describes CDC implementation in IQRF USB devices.

Communication

Communication is based on commands sent from PC and USB device responds with answers. Additionally, USB device can send asynchronous messages as well.

Format

Every command begins with the ">" character. Every answer and asynchronous message begins with the "<" character. It allows easy orientation in directions if PC terminal is used. Every packet is terminated with the `CR` character (`CR LF` is also accepted).

Command:

`>[body][CR]`

Answer:

`<[body][CR]`

Message:

`<[body][CR]`

> `[body]` – body of the command
> `[CR]` – Carriage Return (value `0x0D`)

General error

In case of syntax error or not supported command general error message is issued.

Answer:

`<ERR[CR]`

Communication test

Command:

`>[CR]`

Answer:

`<OK[CR]`

Commands

Reset USB Device

5 s after receiving of this command USB device is reset. This delay allows to disconnect USB communication on PC side in time.

Command:

```
>R[CR]
```

Answer:

```
<R:OK[CR]
```

Reset TR Module

TR module inside the USB device is reset.

Command:

```
>RT[CR]
```

Answer:

```
<RT:OK[CR]
```

Get USB Device Info

Returns USB device identification.

Command:

```
>I[CR]
```

Answer:

```
<I:[type]#[version]#[id][CR]
```

      [type]   – device type (in text format)
      [version] – firmware version (in text format)
      [id]   – serial number (in text format)

Example:

```
>I[CR]
<I:GW-USB-03#02.01#03010000[CR]
```

      [type]   – GW-USB-03
      [version] – 2.01
      [id]   – 0x03010000

Get TR Module Info

Returns identification of TR module inside the USB device.

Command:

`>IT[CR]`

Answer:

`<IT:[module_info][CR]`

> `[module_info]` – description see IQRF OS Reference guide (function `moduleInfo`)

> The TR module in CK-USB-04A is allowed to be plugged / unplugged into / from the SIM connector while powered off only (e.g. while the SW2 pushbutton is held). If TR is plugged in without the CK-USB-04A reset, the *IT* answer is not valid for CK-USB-04A with FW lower than v1.11.

For CK-USB-04A with FW v1.11 or higher the answer takes about 300 ms.

Connectivity Indication

USB device issues an acoustical or optical indication.

Command:

`>B[CR]`

Answer:

`<B:OK[CR]`

Get Status

Returns information about current status.

Command:

`>S[CR]`

Answer:

`<S:[spi_status][CR]`

> `[spi_status]` - value according to the table in IQRF SPI User's guide (chapter SPI status)

Send Data

Sends data to TR module inside the USB device.

Command:

```
>DS[dlen]:[data][CR]
```

[dlen] – data length (number of bytes in the [data] field), in hexadecimal
– range 1 to 41
– range 1 to 64 (GW-USB-05 and CK-USB-04A)
[data] – actual data for TR module
– number of bytes must correspond to [dlen]

Answers:

```
<DS:OK[CR]
```
– data successfully sent to TR module

```
<DS:ERR[CR]
```
– communication failure (checksum error)
– [dlen] out of range
– data length mismatch (number of bytes in [data] does not correspond to [dlen])

```
<DS:BUSY[CR]
```
– SPI bus is busy, communication is just running
– TR module is not in communication mode

Example:

```
>DS[0x05]:Hello[CR]
<DS:OK[CR]
```

Received Data

Asynchronous message sent by the USB device after data receipt from TR module.

Messages:

```
<DR[dlen]:[data][CR]
```
[dlen] – data length (number of bytes in the [data] field), in hexadecimal
– range 1 to 41
– range 1 to 64 (GW-USB-05)
[data] – actual data from TR module

```
<DR:ERR[CR]
```
– communication failure (checksum error)

Example:

```
<DR[0x05]:Hello[CR]
```

Switch to USB Custom Class

USB class is switched to Custom and the device is reset 5 s after this command is issued. This delay allows to cancel USB communication on PC side. Refer to user's manual of given USB device how to return to CDC.

Command:

`>U[CR]`

Answer:

`<U:OK[CR]`

Switch to USB CDC – UART (CK-USB-04A with FW v1.10 or higher only)

USB device is switched to CDC – UART transparent mode and the device is reset 5 s after this command is issued. This delay allows to cancel USB communication on PC side. Refer to user's manual of given USB device how to return back.

Command:

`>UU[CR]`

Answer:

`<UU:OK[CR]`

Switch to USB CDC - SPI (CK-USB-04A with FW v1.10 or higher only)

USB device is switched to CDC – SPI transparent mode and the device is reset 5 s after this command is issued. This delay allows to cancel USB communication on PC side. Refer to user's manual of given USB device how to return back.

Command:

`>US[CR]`

Answer:

`<US:OK[CR]`

Supported devices

- GW-USB-06 with FW v1.00 or higher

- CK-USB-04A with FW v1.01 or higher

- GW-USB-05 with FW v1.03 or higher

- GW-USB-03A with FW v1.00 or higher

- GW-USB-04 with FW v1.20 or higher

- GW-USB-03 with FW v2.01 or higher. The *Switch to USB Custom Class* command is supported from FW v2.03.

Document history

- 150806   Extended for GW-USB-06. Chapters *CDC class* and *Get TR Module Info* revised.
- 150119   Extended for CDC SPI and CDC UART modes.
- 140129   CK-USB-04A support added.
           Document file renamed from MNCDC_130121 to User_Guide_CDC_140129.
- 130121   GW-USB-05 support added.
- 121008   First chapter extended. Bugs in *Switch to USB Custom Class* and *Reset USB Device* fixed.
- 110526   *Switch to USB Custom Class* command added.
- 110318   First release.

Sales and Service

Corporate office

MICRORISC s.r.o., Prumyslova 1275, 506 01 Jicin, Czech Republic, EU
Tel: +420 493 538 125, Fax: +420 493 538 126, www.microrisc.com

Partners and distribution

please visit www.iqrf.org/partners

Quality management

ISO 9001 : 2009 certified

Trademarks

The IQRF name and logo and MICRORISC name are registered trademarks of MICRORISC s.r.o.
PIC, SPI, Microchip and all other trademarks mentioned herein are property of their respective owners.

Legal

All information contained in this publication is intended through suggestion only and may be superseded by updates without prior notice. No representation or warranty is given and no liability is assumed by MICRORISC s.r.o. with respect to the accuracy or use of such information.

Without written permittion it is not allowed to copy or reproduce this information, even partially.

No licenses are conveyed, implicitly or otherwise, under any intellectual property rights.

The IQRF products utilize several patents (CZ, EU, US)

On-line support: support@iqrf.org

Smarter wireless. Simply.