IQRF Development Tools Installation Guide

Application Note

AN003

Simple way to smarter wireless solutions

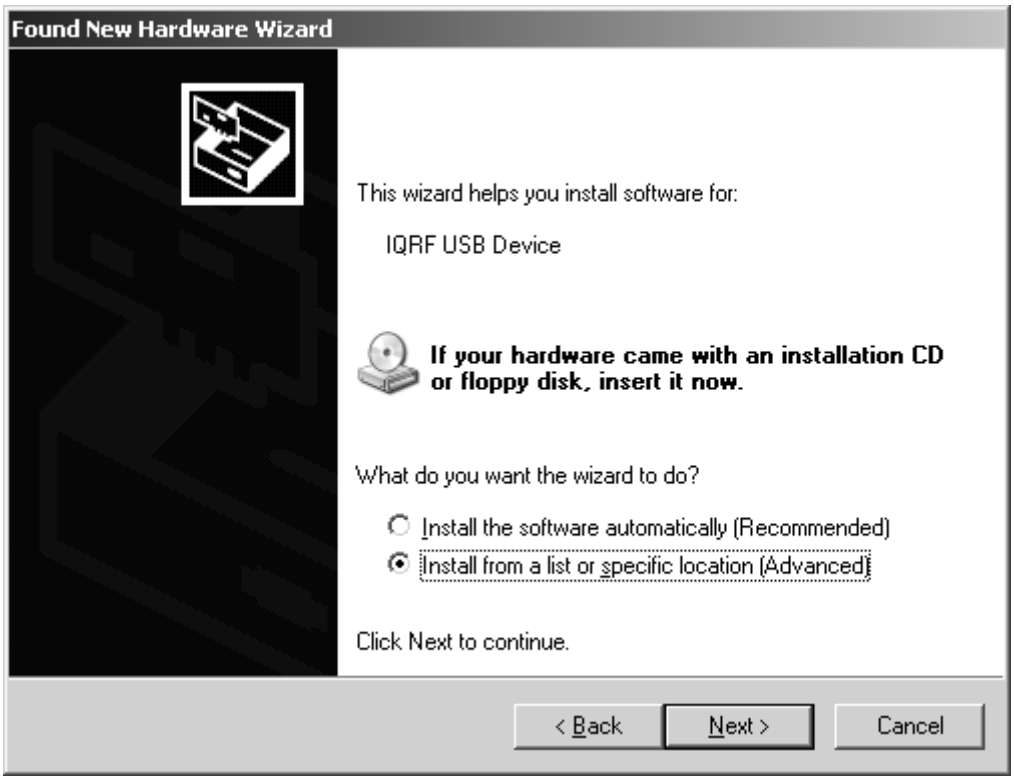
The IQRF development tools utilize the following software:

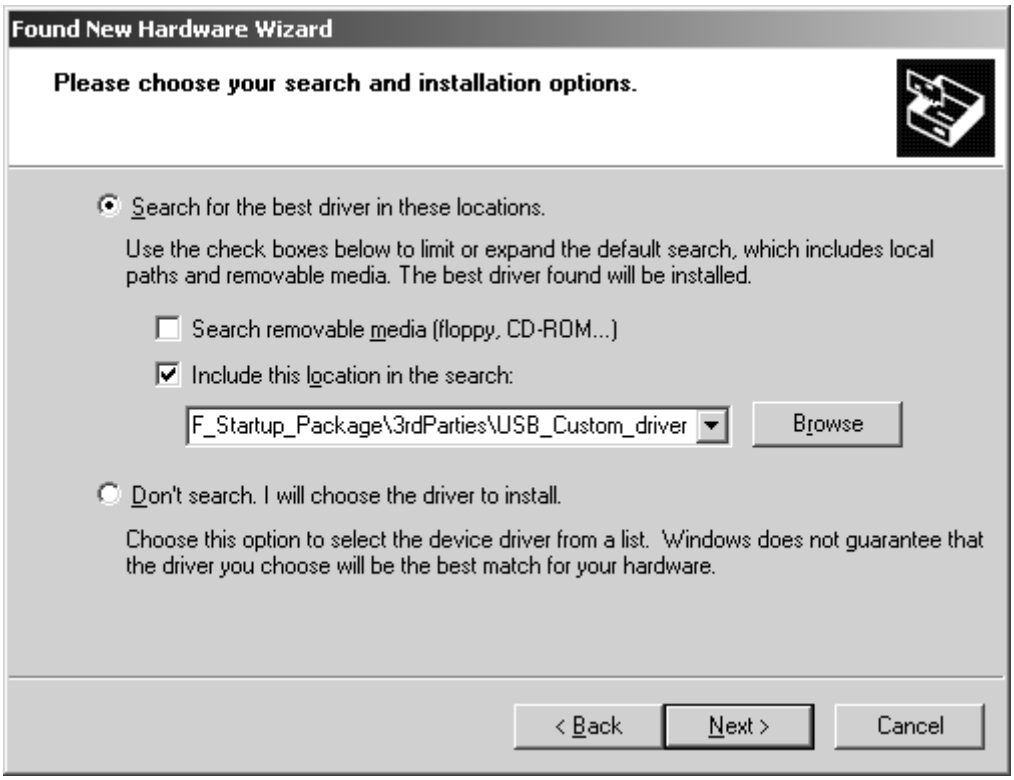
- **IQRF IDE:** integrated development environment to create and debug IQRF applications (MICRORISC)
- **USB Custom driver:** USB driver (Microchip, MICRORISC VID/ PID)
- **CC5X:** C compiler for the PIC microcontrollers (B Knudsen Data)
- **Text editor:** for source texts creations. Any external editor able to save a plain ASCII text, e.g. Windows Notepad can be used. Notepad++ is recommended.

Installation

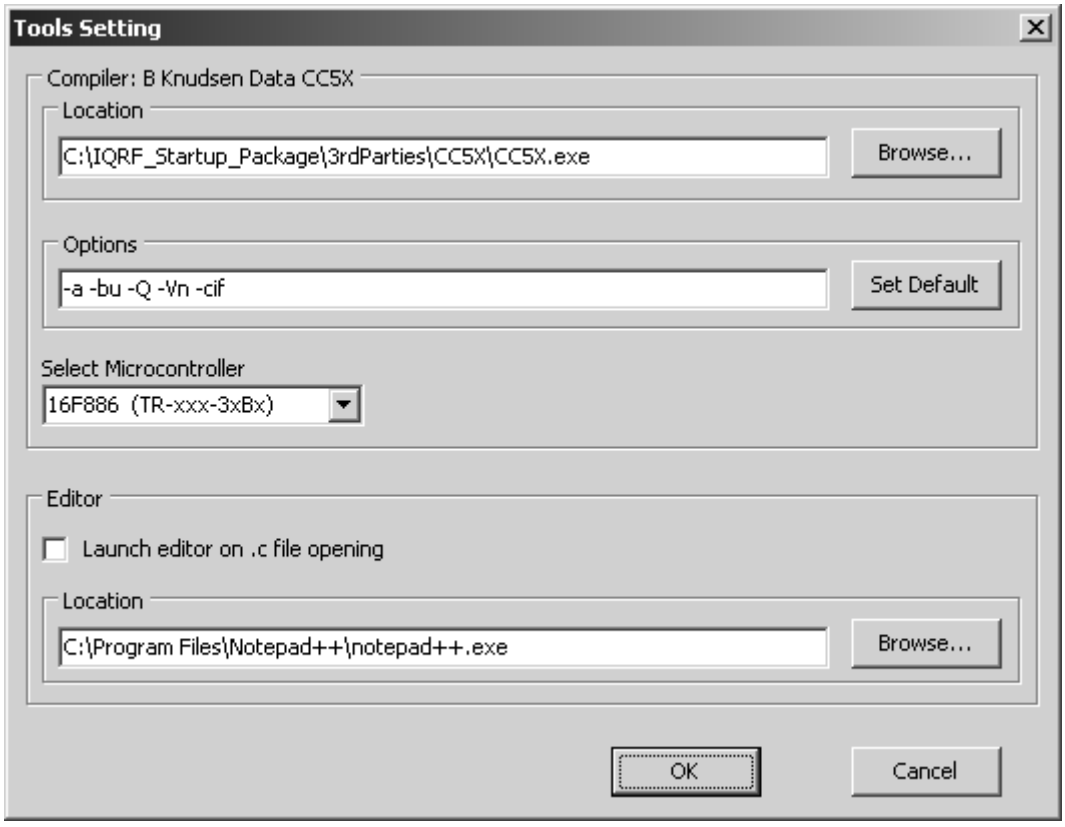
1. The **StartUp Package** is available on the IQRF CD and can be downloaded from www.iq-esupport.com.
2. **Invoke** this selfextracting archive (`StartUpPackage.exe`). All you need is automatically installed (including the free edition of the C compiler for non-commercial purposes) to specified directory.
3. **Connect** the **CK-USB-02** or **CK-USB-03** development kit to the PC. Windows detect a new USB device and ask about the **driver location**. Navigate to the `USB_Custom_driver` subdirectory.

Example for Windows XP:


Found New Hardware Wizard
This wizard helps you install software for:
IQRF USB Device
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
F_Startup_Package\3rdParties\USB_Custom_driver
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

4. **Invoke** the **IQRF IDE**.
5. Select a **microcontroller** according to the module type and set the **path to the editor** in the *Settings / Tools Setting* menu:



Tip: Notepad++ (a part of the Package) is very suitable editor. **Install** it by invoking the Installer (the .EXE file) in the **Notepad++** directory.

Test of TR modules

TR modules are delivered with the E09-LINK sample program (additionally with the welcome message text in EEPROM). After power supply connecting e.g. in the DK-PGM-01(02) or CK-USB-02(03) the successful run-up is indicated by four flashes of the LED on the TR.

TR modules are prepared from the factory to be ready for RF range test just after connecting of antennas to a TR pair. LEDs on the modules flash if the modules are in range each other. By increasing the distance out of range the flashes stop and are reestablished after bringing closer again. See comments in the E09-LINK program.

Proper connection between the CK and PC can be checked by the *Reset Module* button in the IQRF IDE environment. It should induce another initial sequence of four LED flashes.

Examples

The Package contains a series of examples in the `src` directory.

1. **Using a ready-made example** (without modifications): Upload the .HEX file (in the `hex-88` or `hex-886` subdirectory, according to the TR microcontroller type) into the TR module plugged in the CK-USB-02(03) kit by the *Programming* tab in the IQRF IDE environment.
2. **Using an example with possible modification**: Modifications are enabled by editing of the source program (a .C file) followed by compilation from the C language to the .HEX format also in the *Programming* tab in the IQRF IDE environment. Then continue according the case 1 above.
3. ***Creation of a new pro*gram**: It is recommended to start from the empty template `E00-START.c`.The user creates a complete program by themselves in this case. Continue similarly as in the case 2 above.

To complete an IQRF design, proceed as follows:

1. Select the PIC type for the TR transceiver module used (see above). Plug the TR into the CK kit.
2. If you do not intend to modify or display the source code but to program the existing code only, open required .HEX file by the *Open file* button and go to step 6.
3. Open required source file – e.g. some of examples from the Package – (e.g. `E09-LINK.c`) or empty template `E00-START.c` by the *Open file* button.
4. Make possible modifications and save them then (in the text editor).
5. Compile the program by the *Compile* button. If any error is reported by the compiler, go to step 3 to correct it. The result is a compiled code in the .HEX format.
6. Switch the module to the programming mode by the *Enter PROG Mode* button.
7. Program the code into the module by the *Upload* button.
8. After uploading the application is just invoked. It is possible to debug it by the IQRF IDE (Debug, SPI Test, Terminal).
9. After programming the module can be moved e.g. to the DK-PGM-02(03) kit or to an end user equipment.
   The TR module can be plugged / unplugged into / from the SIM connector while powered off only. Power supply of the CK-USB-02 kit can be switched off by holding the TR reset pushbutton (S1, see the User's guide).

Then, repeat steps 3 to 9 as you need.

See IQRF IDE *Help* for details. E.g. steps 6 and 7 can be performed in one stroke by the F5 key.

Typical repeated procedure is:

- Edit external editor
- Save (Ctrl+S) external editor
- Compile (F10) IQRF IDE – the *Programming* tab
- Upload (F5) IQRF IDE – the *Programming* tab
- Debug IQRF IDE – the *Debug*, *Terminal* a *SPI Test* tabs

Note: The IQRF IDE detects a TR module only if it has the SPI communication activated which depends on the application just running in the module. Otherwise IDE issues the *SPI not working* message. SPI communication can be established by entering the programming mode in the IDE. The application in the TR module is not running in the programming mode.

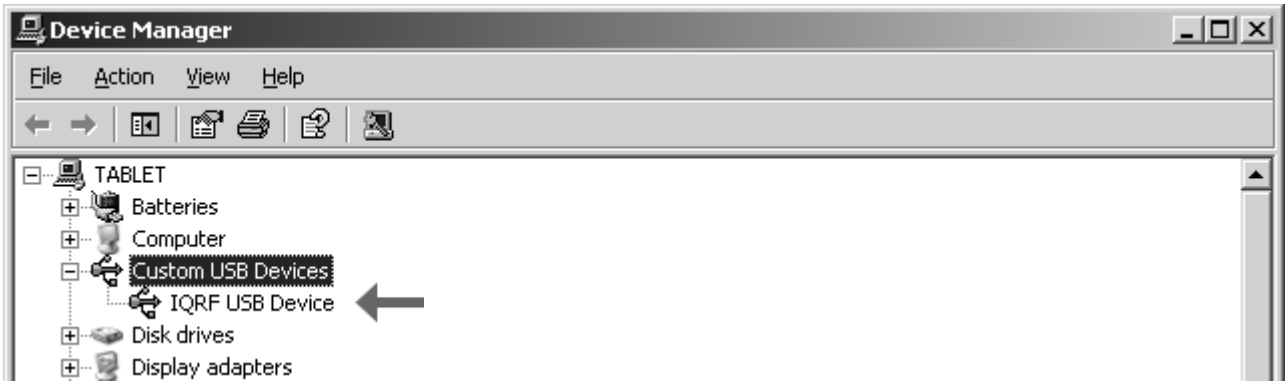
Solution of possible problems

Firmware version of the CK kit, the USB driver version and the IQRF IDE version must be in accordance each other (marked with **+** in the table):

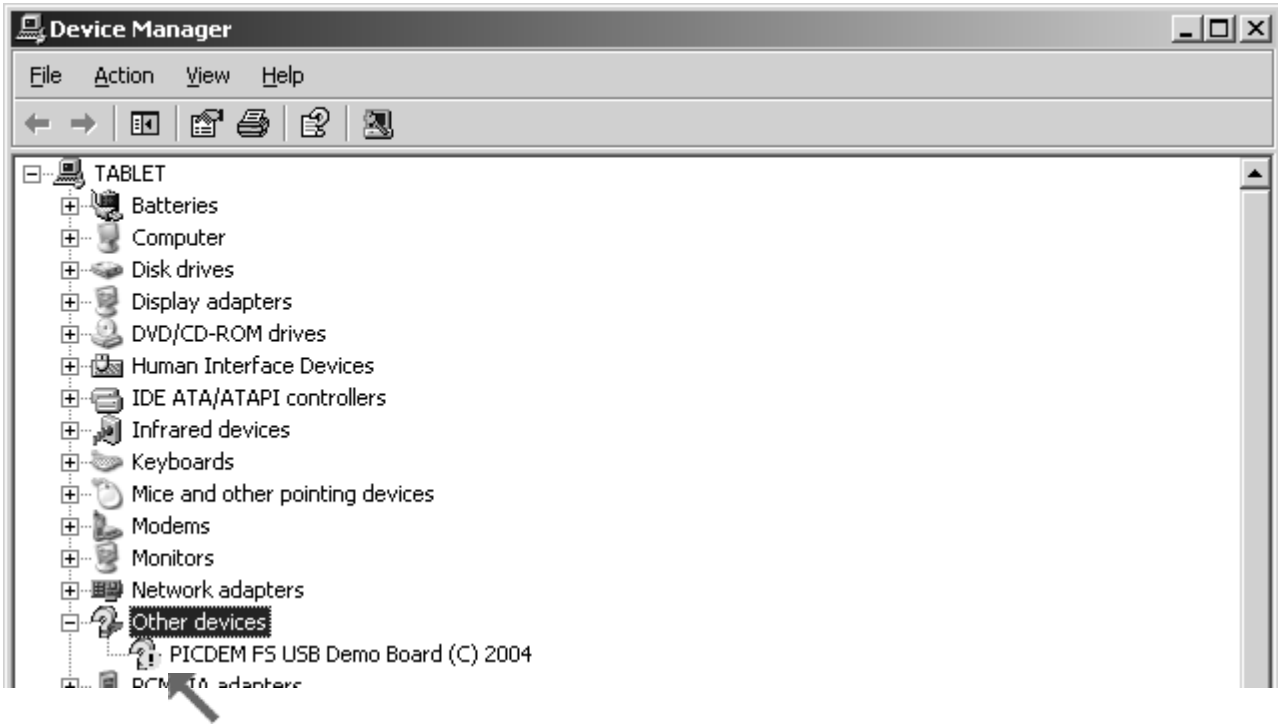
	CK-USB-02		CK-USB-03	USB driver
	FW 1.x (obsolete)	**FW 2.xx**	**FW 2.xx**	
IQRF IDE v1.0x (obsolete)	**+**	–	–	**V2.3** (Microchip PICDEM FS... device)
IQRF IDE v2.xx	–	**+**	**+**	**V1.0** (IQRF USB device)

Advanced combination is CK-USB-02 with firmware v2.00 or higher or CK-USB-03, USB driver v1.0 and IQRF IDE v2.00 or higher. CK firmware can be upgraded by the manufacturer and from version FW 2.00 even by the user themselves.

Properly installed driver v1.0 are displayed as follows:



Improperly installed driver can be displayed e.g. as follows:



See Control Panel / System / Hardware / Device Manager.

Sales and Service

MICRORISC s.r.o., Delnicka 222, 506 01 Jicin, Czech Republic, EU
Tel: +420 493 538 125, Fax: +420 493 538 126, www.microrisc.com

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Please visit www.iqrf.org/partners

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Web	**www.iqrf.org**
E-mail	**sales@iqrf.org**
On-line support	**http://iq-esupport.com**

Simple way to smarter wireless solutions