

# **IQRF Application Examples**

## **Application Note**

# **AN006**



Simple way to smarter wireless solutions

To simplify creation of applications, IQR offers a set of examples. They illustrate working with all important features of transceiver modules, operating system and principles of communication on the IQR platform when programming in C language. Examples are fully functional using IQR development tools (e.g. CK-USB-02 and DK-PGM-02) or development sets.

Besides of actual programs (files with the .c extension), the examples use also some header files (with the .h extension). They are system files intended for linking of user program with operating system. Some of them can serve to the user for information but the user should not make any changes in them in any case. If the user wants to have his own declarations in separate file(s) he should use his own file(s) for them.

To keep this system of examples functional, the files have to be stored in proper directories with proper structure which is created during installation (see Application note AN003, [www.iqrf.org/downloads](http://www.iqrf.org/downloads)). The structure is as follows:

- work directory (e.g. src)
  - includes
    - 31B

Source programs (.c) must be stored in work directory.

New user programs can be created by modification of any example. Another possibility is using the template E00-START where actual user program can be included in appointed place. Seamless linking with OS is ensured for both approaches. Proper microcontroller type must be selected in IQR IDE development environment before compiling (Settings/Tool Settings/Select Microcontroller).

Example LED (StartUp) is intended to be used first by first time users. It is not accomplished by wireless transfers, does not need cooperation between transmitter and receiver and the result is simply indicated visually. Thus, functionality of complete IQR development system (HW and SW installation, editing, compiling, upload etc.) can be checked very simply.

Topic	Description	File
<b>C header files - use read only!</b>		
<b>For C compiler</b>	Declarations for microcontroller HW (SFR registers, peripherals, ...)	16F88.h
		16F886.h
<b>For OS</b>	Declarations for OS (pins, variables, flags, ...)	IQR-memory.h
	Declarations of OS functions	IQR-functions.h
	Necessary statements	template-basic.h
	OS system macros	IQR-macros.h
<b>Application examples</b>		
<b>LED</b>	For the first time users, without RF. Start here!	StartUp.c
<b>RF transmitter</b>	RF packet transmitting	E01-TX.c
<b>RF receiver</b>	RF packet receiving and visualization on PC	E02-RX.c
<b>RF transceiver</b>	Repeated receiving a packet and transmitting it back again. Suitable even for a range test.	E03-TR.c
<b>EEPROM</b>	EEPROM acces – byte/block read/write. Visualization on PC. IQR IDE Debug.	E04-EEPROM.c
<b>Timing</b>	Timing explanation and delay control	E05-DELAYS.c
<b>RAM</b>	RAM access - direct, indirect, working with buffers	E06-RAM.c
<b>SPI</b>	Working with SPI. Possible exploring via IQR IDE SPI Test and Terminal.	E07-SPI.c
<b>Temperature</b>	Temperature measurement and sending via SPI	E08-TEMPERATURE.c
<b>RF link</b>	Simple RF link checker (range test)	E09-LINK.c
<b>Battery check</b>	Battery check	E10-BATTERY.c
<b>Networking</b>	Coordinator: Data acquisition from Nodes	E11-DATACENTER.c
	Nodes: Counting "pulses". Sending to a central unit on request	E12-MEASUREMENT.c
<b>Templates – for new designs</b>		
<b>Template</b>	Template for new designs	E00-START.c

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