IQRF Application Examples

Application Note

AN006

Simple way to smarter wireless solutions

To simplify creation of applications, IQRF offers a set of examples. They illustrate working with all important features of transceiver modules, operating system and principles of communication on the IQRF platform when programming in C language. Examples are fully functional using IQRF development tools (e.g. CK-USB-04, DK-EVAL-04 or CK-USB-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 header 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). The structure is as follows:

- work directory (e.g. `src`)
  - `includes`

Source (`.c`) programs (and header files for PIC) must be stored in work directory. Compiled HEX files are also available in the `hex` subdirectory.

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 TR module type must be selected in IQRF IDE development environment before compiling.

Example `LED` (`StartUp`) is intended to be used first by the 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 IQRF development system (HW and SW installation, editing, compiling, upload etc.) can be checked very simply.

Topic	Description	File
C header files - use read only!		
For PIC	Declarations for microcontroller HW (SFR registers, peripherals, ...)	**16F886.h**
For OS	Declarations for OS (pins, variables, flags, ...)	**IQRF-memory.h**
	Declarations of OS functions	**IQRF-functions.h**
	Necessary statements	**template-basic.h**
	OS system macros	**IQRF-macros.h**
Application examples		
LED	For the first time users, without RF. Start here!	**StartUp.c**
RF transmitter	RF packet transmitting	**E01-TX.c**
RF receiver	RF packet receiving and visualization on PC	**E02-RX.c**
RF transceiver	Example of RF TX/RX. Suitable also for wireless PC link.	**E03-TR.c**
EEPROM	EEPROM acces – byte/block read/write. Visualization on PC. IQRF IDE Debug.	**E04-EEPROM.c**
Timing	Timing explanation and delay control	**E05-DELAYS.c**
RAM	RAM access - direct, indirect, working with buffers	**E06-RAM.c**
SPI	Working with SPI. Possible exploring via IQRF IDE SPI Test and Terminal.	**E07-SPI.c**
Temperature	Temperature measurement and sending via SPI	**E08-TEMPERATURE.c**
RF link	Simple RF link checker (range test)	**E09-LINK.c**
RF modes	RF power management modes	**E10-RFMODE-TX.c**
		E10-RFMODE-RX.c
Networking	IQMESH Coordinator and Node	**E11-IQMESH-C.c**
		E11-IQMESH-N.c
Templates – for new designs		
Template	Template for new designs	**E00-START.c**

Compilation without IQRF IDE usage

For seemless usage of these examples also without IQRF IDE, the TR module type should be specified as follows:

`#define TR52B` for TR-52B and TR-53B

The simplest way to do it is to include the appropriate D parameter to command line while invoking the CC5X compiler.

Example: `CC5X -DTR52B` *`other arguments`*

Document history

- 110107 Updated for OS v3.00
- 091201 Modified for IQRF OS v2.10
- 090907 First release

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