

Wireless Evaluation Kit (433-WEK87xx)

1. Overview

Wireless Evaluation Kit (WEK) is a set of devices specifically designed for evaluation purposes of the wireless technology functionality. While working on the different projects specialists from “FR-Systems” noticed that many customers would like to evaluate whether wireless technology and products developed by “FR-Systems” meet their expectations and match to criteria of the end solution. Usually WSN product providers offer wide spectrum of OEM modules or developer kits, aimed to cover any application at the customer side. In most of the cases there is a need from customers to quickly develop a prototype solution covering major aspects of the future solution or product. However, OEM module or developer kit may not be a good choice in such a case.

Let's take some “general WSN project” as an example. To make it more specific lets it be an “automated meter reading system” collecting data from water meter devices. Company “X” develops range of water meter devices and would like to expand the products range, adding remote control and data acquisition capability. There are few alternative solutions may be considered for evaluation, and one of the approach is to collect data from end devices using WSN technology. It's important for company “X” to quickly make an estimation of the time and resources investments required to build the new type of the products as well as to minimize possible risks when applying new technology. The standard approach offered by most of the companies producing WSN solutions is to use so called “developer kit”. It is a set of autonomous WSN devices allowing customer to develop and test some specific application. In most of the cases these devices have several types of sensors on-board and practically no external interfaces to integrate these devices with external devices. To do anything useful company “X” will have to study software API, develop some test applications and make it workable after significant amount of testing and debugging. What is more important there is a big chance that developed application will not work properly with real devices and products that customer has at hands. Is there any chance for company “X” to quickly develop some simple prototype solution integrating WSN and its products and providing a definite answer about WSN functionality? The WEK from FR-Systems is intended to help customers simplify prototyping and evaluation stage of the project. Idea behind the WEK is very straightforward provide to customers flexible tool to perform the following tasks:

- Evaluate radio transmission reliability at the customers premises
- Integrate the WSN technology and test its with existing products/systems
- Build a simplified prototype of required solution
- Estimate required efforts and resources to build the end-solution

WEK provides simplified subset of WSN functionality and doesn't require additional programming to integrate it into the existing system infrastructure.

The WEK tool set is ideally suits to any type of systems and applications such as:

- Industrial automation
- Security systems
- Utilities metering systems (AMR)
- Telemetry systems
- Building automation
- Intellectual house
- Precision farming
- Engineering systems monitoring
- Transport monitoring
- Pipes monitoring
- Ecological monitoring
- And many others

2. Features Overview

The WEK consists of several key components:

- Autonomous wireless to RS485 converter - 04WRS485, please refer to "04WRS485 Rev.1.0 (BRF).pdf" document for more details about the radio modem features
- Wireless USB bridge - 04USB203-S, please refer to "04USB203-S Rev.1.0 (BRF).pdf" document for more details about USB bridge features
- Can be optionally packaged with WSN-GSM-Gateway (optional, by special request)

Number of devices included into the WEK package depends on customer needs. There are several types of 04WRS485 radio modes available:

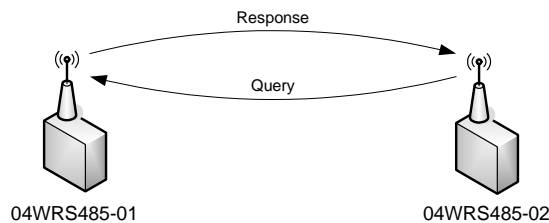
- **04WRS485-01** – autonomous, battery powered wireless radio modem working at ISM 433 MHz frequency range with 4Mbit Flash-memory on-board and external RS-485 interface (half-duplex, data rate up to 115200 bit/s)
- **04WRS485-02** – autonomous, battery powered wireless radio modem working at ISM 433 MHz frequency range with 4Mbit Flash-memory on-board without an external RS-485 interface

There are several operation modes available for the users to work with the WEK.

WEK operation modes

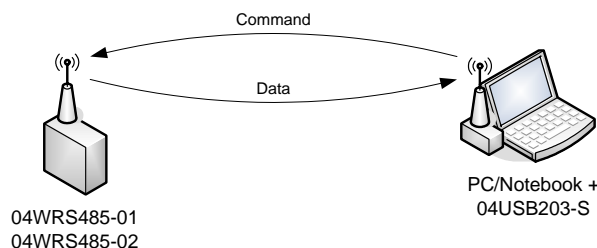
1) RF-LINK

This mode is designed for evaluation of radio signal propagation at the customer's premises. Scenario of this mode is simple point-to-point communication between nodes. During communication each nodes writes into the internal Flash-memory the following data transmission parameters: RSSI (received signal strength indicator), LQI (link quality indicator), PER (packer error rate) and other network communication information. The two-color LEDs indicate data transmission status. Number of nodes can be extended from two(minimal configuration) to 10(optimal configuration). This mode is similar to "ping" utility of TCP/IP protocol. Communication within the network organized by scheme of "star" when one node called "Master" sends requests to all the nodes one by one. Usual scheme of communication depicted on the picture below:



2) READING

All information collected during RF-LINK mode can be acquired from the nodes and analyzed by user. In this mode all information will be collected to the PC via USB bridge and analyzed later. Operation scenario depicted on the picture below:

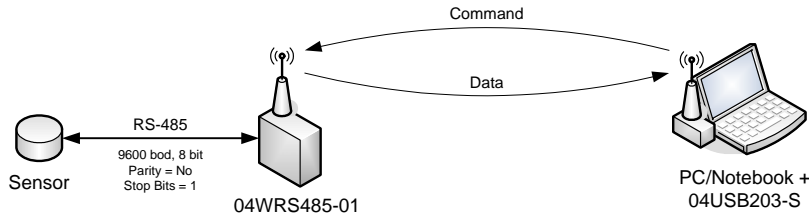


3) CONTROL (SERIAL-LINK)

This mode can be used when integration with external device is required. In this mode commands and data can be transmitted between nodes. The 04WRS485 nodes can be connected to any device which has RS485 interface. There could be several options of data communication:

- Commands/data transmission from PC to external device
- Organization of "transparent serial channel" between two and more nodes. External devices operate as if they were communicating via wired link
- Combination of first two options

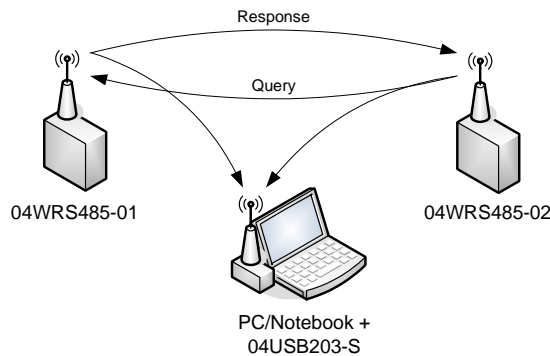
Settings of the RS485 interface, such as data rate, parity, stop bits, and flow control will be set depends on customer needs. Specific protocols can be supported, if needed. Simplified communication scheme is presented below:



Simple Windows application is provided to organize data communication between PC and 04WRS485 node. Optionally Windows DLL library can be provided if user wants to integrate the CONTROL mode functionality into its application. Please refer to "WEK User Guide" for description of application and DLL API.

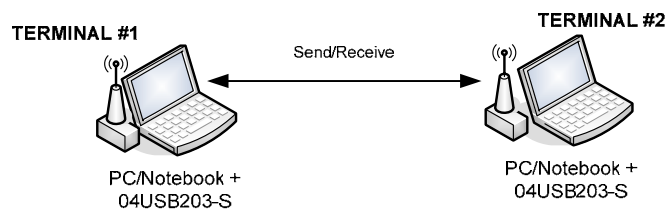
4) SNIFFER

In some of the cases it's useful to see communication activities between nodes, which is applicable for analyses and debugging purposes. SNIFFER mode specifically designed for that purposes. In this mode all the messages send between WSN nodes can be received on the PC via USB bridge. All received information will be shown on the PC. Operation scenario depicted on the picture below:



4) TERMINAL

This mode is useful when two or more PC have to be connected via radio link. Configuration can be a simple point-to-point channel or many-to-many. Simple windows program allows sending any data to all other PCs, received information will be shown immediately. 04USB-S have to be used for this scenario.



About company: «FR-Systems» ® was founded in early 2007, specializes in wireless technology. Company develops complete wireless based solutions for such domain areas as: industrial automation, building and home automation. Information about products can be found at company web-site.

www.fr-systems.com