

Product Brief – JN5 Series-SDK

Wireless Microcontroller Software Developer Kit

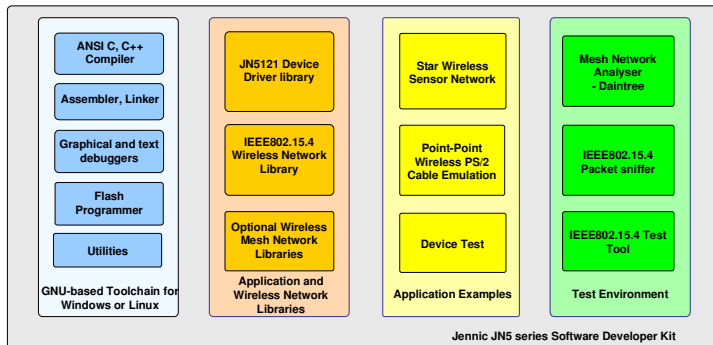
Overview

Jennic provides a comprehensive software development kit for rapid development of wireless sensor network applications using the JN5121 wireless microcontroller. The tool-suite and libraries can be used to allow product developers to accelerate market entry and reduce development cost.

The development toolchain provides all the tools required for application development and includes C/C++ compiler, linker, assembler and debugger. The tools are based upon the stable GNU toolset and may be installed and used on Windows or Linux PCs.

A suite of library functions provides all the elements required to build wireless network products based upon the IEEE802.15.4 standard. The library includes separate APIs for access to microcontroller peripherals and wireless network communications. The peripherals API enables simple access to the microcontroller functions and also includes typical control and sensor peripherals. The wireless network API provides drivers for star, tree and optionally mesh networks. Example applications show how to implement a star network with controller and remote sensors.

Block Diagram



Benefits

- Complete, unrestricted toolchain
- C compiler for rapid code development
- Examples accelerate application development
- Simple APIs speed integration
- Easy integration to editors and version control systems
- Runs on low cost PC platforms

Applications

- Robust and secure low power wireless applications
- Wireless sensor networks, particularly IEEE802.15.4 / ZigBee solutions
- Home and commercial building automation
- Home networks
- Toys and gaming peripherals
- Industrial systems
- Telemetry and utilities (e.g. AMR)

Features: Toolchain

- Stable GNU based toolchain
- ANSI C, C++ compiler
- Assembler, linker, debugger
- Flash programmer
- Windows / Linux platform

Libraries

Microcontroller drivers

- Timers, PWM and sigma-delta output
- UART Serial interface
- SPI and 2 wire interface
- Analogue I/O
- Digital I/O
- Power mode control

Peripheral drivers

- Temperature sensor
- Humidity sensor
- Light sensor
- Display drivers
 - LCD and LED drivers

Network libraries

- Point-to-point, star, tree networks
- IEEE.802.15.4 network
- Mesh network (optional)
- Build versions for different topologies

Application examples

- Star Wireless Sensor network
- Wireless PS/2 keyboard
- Home automation demonstration

Test environment

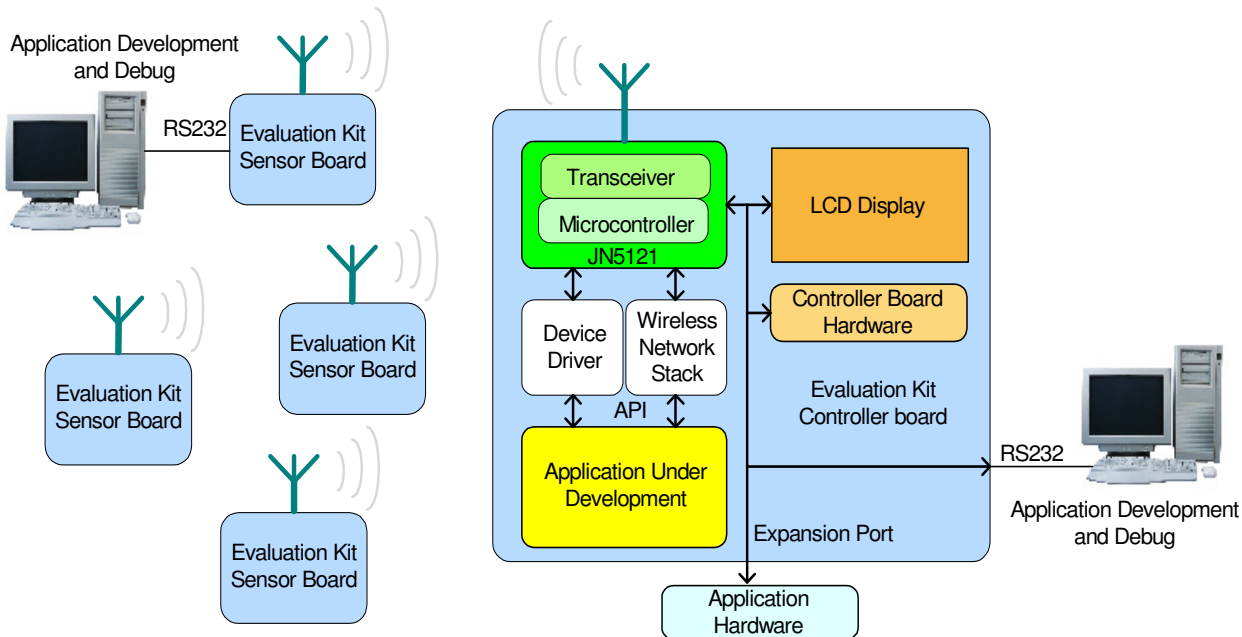
- Daintree Networks sensor network analyser
- IEEE802.15.4 network and device configuration test tool
- IEEE802.15.4 packet sniffer

The software development kit provides a PC based environment for application development. Programs are developed using standard 'C' code and linked with the libraries for the peripherals and wireless network stacks. Executable code is downloaded to the sensor and controller boards using Jennic's flash programmer connected via a RS232 serial cable. The application may then be debugged using either command line or graphical debug tools.

Access to all the microcontroller functions and peripherals is provided via library functions. The API has been designed to ensure straightforward sensor network application development, to simplify control of Jennic's JN5121 device and to enable integration of third party sensors. The libraries include additional functions for reading and controlling many common discrete sensor chips and controls that can be connected to Jennic's single chip device.

A separate library provides access to all the networking functionality required to operate as a network node. Point-to-point, star and mesh network applications can be supported, using either standards based or proprietary network layers. Standards based mesh network layers with a simple interface are available from Jennic and our partners.

Application Diagram



Example source code for a home control system, which requires monitoring of heat, light, humidity and both reading switches and control of outputs is included. This application can be readily modified to develop new wireless sensor network products. Additional application notes demonstrate cable replacement with a wireless point-to-point link, with the JN5121 being used to emulate a PS/2 cable for a keyboard.

A PC based device test environment is provided comprising a basic PDU sniffer application, a network development and test application, and a trial version of Daintree Networks' sensor network analyser package. A controller or sensor board from the evaluation kit can then be used to monitor the wireless network and pass data to the PC for display and analysis.