



ATMEL® AVR® RZ RAVEN EVALUATION RELEASE

The Arch Rock IP/6LoWPAN Software Distribution provides a binary, linkable kernel library with C APIs for operating system services and standard TCP/UDP/IP-based networking over a low-power, ad-hoc, wireless mesh network based on the IEEE 802.15.4 and IETF 6LoWPAN (RFC4944) standards. This release is a free evaluation copy specifically targeting the Atmel RZ Raven Kit supporting the Atmega1284P MCU and RF230 radio chip combination. It also contains sample applications that can be directly loaded on the RZ Raven boards to demonstrate TCP/IP-based communication on low-power, embedded platforms using Unix socket-based interfaces.

STANDARDS COMPLIANCE

IEEE802.15.4-2006
Internet Protocol, Version 6 (IPv6) Specification

SUPPORTED CHIPSETS

Atmel ATmega1284P MCU
Atmel RF230 Rev B Transceiver

LIBRARY FOOTPRINT

Program Flash Memory:
36.7 KBytes*

System RAM:
1.4 KBytes

Network RAM Buffer:
2.4 KBytes**

DEVELOPMENT ENVIRONMENT

AVR Studio® 4.13 and SP2 or greater
C compiler and tool chain in WinAVR™
4.2.2 20071221 from SourceForge

SAMPLE APPLICATIONS

Common ICMP support demo (e.g. ping)
TCP Echo Server Demo
UDP Periodic Data Streaming Demo
Telnet and Shell Demo
Serial communication with Raven Atmega3290p
Co-processor

Arch Rock 6LoWPAN PC Utility

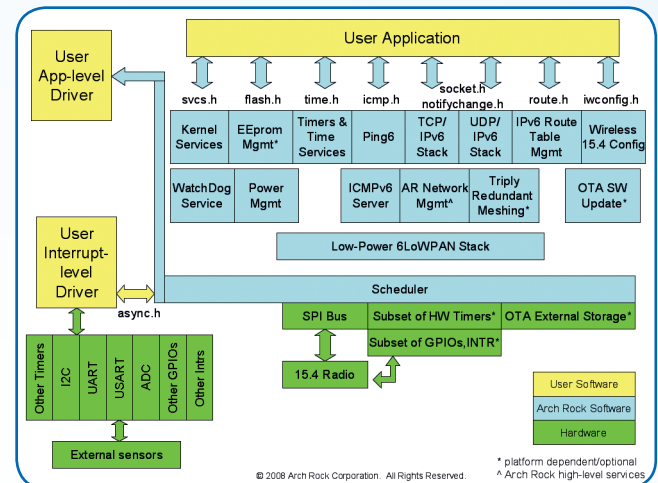
Provides a virtual PC network interface for the 6LoWPAN Network with AVRRZUSBSTICK plugged into USB port
Provides Web UI for management of the attached 6LoWPAN network
Provides DHCP addressing for Raven boards
Enables standard TCP/UDP-based communication between the PC and Raven board

* Tunable based on number of network ports

** Tunable based on network buffer size

KEY FEATURES

- Socket interfaces for standard TCP or UDP communication
- Familiar network management interfaces: ICMP ping(), iwconfig()
- Low-power, triply redundant, responsive mesh networking
- Other operating system services: Timers, Time Service, Flash Management



Detailed ASD Diagram

Please visit <http://support.archrock.com/asd> for the latest updates and other Arch Rock Software Distributions.

APPLICATION PROGRAMMING INTERFACES

ICMPv6 :

- **ping()** Perform the standard ICMP ping service to an unicast IP address or to a link local multicast address

IPv6 ROUTING :

- **num_rtrtries()** Get the number of valid route entries in the routing table
- **routecntl()** Get and configure the routing table. The routes in the route table can be extracted or changed

INTERRUPT MANIPULATION/CRITICAL REGION PROTECTION :

- **atomic_begin()** Disable global interrupt for the start of a critical section
- **atomic_end()** Enable global interrupt for the end of a critical section

SYSTEM SERVICES :

- **close()** Closes a resource identifier (e.g. socket, timerid, or a resource id) so that it may be reused
- **iwconfig()** Configure the wireless link interface
- **notifywrite()** Register a callback for when a socket identifier has enough buffer space to accept data for transmission
- **svccntl()** Invoke kernel services or listen for kernel notifications

SOCKET PROGRAMMING :

- **socket()** Create an endpoint for communication and return a descriptor
- **send()** Send a message on a socket in a connected state
- **sendto()** Send a message on a socket in a connectionless state
- **udpbind()** Give a UDP socket the local address, a user allocated buffer for message queuing, and a callback for reception notification
- **tcpbind()** Give a TCP socket the local address, a user allocated buffer for message queuing, and a callback handler for interacting with the TCP stack
- **connect()** Connect the socket referred to by the socket descriptor to a destination IP address
- **accept()** Accept an incoming connection on the socket referred to by the socket descriptor to an destination IP address
- **inet_pton()** Convert the character string src into a network address structure in the af address family, then copies the network address structure to dst
- **recvfrom()** A callback handler that signals a UDP packet reception destined to my address

CONTEXT SWITCHING :

- **continuation()** Request a unique resource identifier that enables scheduling a continuation from the interrupt context to Arch Rock's application context
- Note this call is safe to be invoked in the interrupt context
- **sch_continuation()** Schedule a continuation from the interrupt context to Arch Rock's application context. Note this call is safe to be invoked in the interrupt context

TIME MANIPULATION :

- **gettimeofday()** Access time of day
- **settimeofday()** Set time of day
- **timer()** Request a unique resource identifier
- **getitimer()** Get value of an interval timer
- **setitimer()** Set the value of an interval timer

FLASH MANIPULATION :

- **flread()** Read the on-chip flash
- **flsize()** Get the total size of the internal non-volatile storage in bytes that are available for application to use
- **flwrite()** Write a buffer to the on-chip flash

Who We Are:

Arch Rock is a pioneer in standards-based wireless sensor network (WSN) technology. The company's products, which gather data from the physical world and integrate it into the enterprise IT infrastructure, are used in environmental monitoring, tracking and logistics, industrial automation and energy monitoring and control.

