Features

- Drop in Wi-Fi solution for existing systems currently using 802.15.4 modules
- Based on Roving Networks' robust RN-171 Wi-Fi module
- Based on pseudo-standard footprint
- Native internet connectivity provides internet access to every node
- No custom profiles needed
- Ultra-low power: 4uA sleep, 40mA Rx, 180 mA Tx at 10dBm
- Configurable transmit power: -2dBm to +12dBm
- Hardware interface: TTL UART
- Data rate: 464Kbps using hardware flow control
- Through hole board simplifies system integration
- 8 general purpose digital I/O
- 3 analog sensor interfaces.
- Real-time clock for wakeup and time stamping
- Complete TCP/IP networking stack
- Wi-Fi Alliance certified for WEP, WPA and WPA2-PSK
- FCC / CE/ ICS certified and RoHS compliant.

Applications

- Industrial metering
- HVAC control
- Room temperature sensors
- Pump configuration and control
- Telemetry
- PV/Solar controllers
- Robotics

Description

The RN-XV is a 802.11 b/g solution especially designed for customer who want to migrate their existing 802.15.4 architecture to a more standard TCP/IP based platform without having to redesign their existing hardware.

Based on a pseudo standard footprint often found in embedded applications, the RN-XV module from Roving Networks allows for Wi-Fi connectivity using 802.11 b/g standards in legacy and existing designs that may have been based upon 802.15.4 standard.

The RN-XV module is based upon Roving Networks' robust RN-171 Wi-Fi module and incorporates 802.11 b/g radio, 32 bit SPARC processor, TCP/TP stack, real-time clock, crypto accelerator, power management unit and analog sensor interface.

The module offers additional functionality through its onboard programmable GPIOs (10) and ADCs (8). The ADCs provide 14-bit resolution while the GPIOs can be configured to provide standard functionality or status signaling to a host microcontroller to reduce the need for serial polling between the Wi-Fi module and host microcontroller.

The module is pre-loaded with firmware to simplify integration and minimize development time of your application. In the simplest configuration, the hardware only requires four connections (PWR, TX, RX and GND) to create a wireless data connection.

Overview

- Host Data Rate up to 460Kbps over UART
- Intelligent built-in power management with programmable wakeup events (timers and I/O)
- Real time clock for time stamping, auto-sleep and auto-wakeup modes
- Configuration over WiFi or UART using simple ASCII commands
- Over the air firmware upgrade via FTP
- Secure WiFi authentication: WEP, WPA-PSK (TKIP), WPA2-PSK
- Built in networking applications DHCP, DNS, ARP, ICMP UDP, Telnet, FTP, HTML client
- 802.11 b/g power save and roaming functions
- Configurable transmit power: -2dBm to 12dBm
- WPS push button mode for easy and secure wireless setup
- Built-in HTML web client to send GPIO, UART and sensor data to remote web servers

Environmental Conditions

Parameter	Value
Temperature Range (Operating)	-40 ^{o}C - 85 ^{o}C
Temperature Range (Storage)	-40°C - 85 ^{o}C
Relative Humidity (Operating)	≤90%
Relative Humidity (Storage)	≤90%

Electrical Characteristics

Supply Voltage	Min	Typ.	Max.	Unit
Input Power	3.0	3.3	3.7	V
Power consumption				
Sleep		4		uA
Standby (doze)		15		mA
Connected (idle, RX)		40		mA
Connected (TX)		180 at 10dBm		mA

Analog Sensor Inputs

| Parameter	Value
Sense 0,1,2,3 wakeup detect threshold	500mV
AD sense 0-4 measurement range	0-400mV
Precision	14 bits = 12uV
Accuracy	5% un-calibrated, .01% calibrated
Minimum conversion time	35uS (5kHz over Wi-Fi)
Sensor Power (pin 33) output resistance 3.3V	10 ohms, max current = 50mA

Radio Characteristics

| Parameter	Specifications
Frequency	2402 ~ 2480MHz
Modulation	802.11b compatibility : DSSS(CCK-11, CCK-5.5, DQPSK-2, DBPSK-1) 802.11g : OFDM (default)
Channel intervals	5MHz
Channels	1 - 14
Transmission rate (over the air)	1 – 11Mbps for 802.11b / 6 – 54Mbps for 802.11g
Receive sensitivity	-83dBm typ.
Output level (Class1)	0dBm to +12dBm (software configurable)

Transmit Power

Output Power	802.11 b (2Mbps) Current in mA*	802.11 g (24Mbps) Current in mA*
0	120	135
2	130	150
4	170	190
6	175	200
8	180	210
10	185	225
12	190	240

* Measured at 3.3VDC input. The power consumption is the average power, active during actual power consumption

Physical Dimensions and pin out table
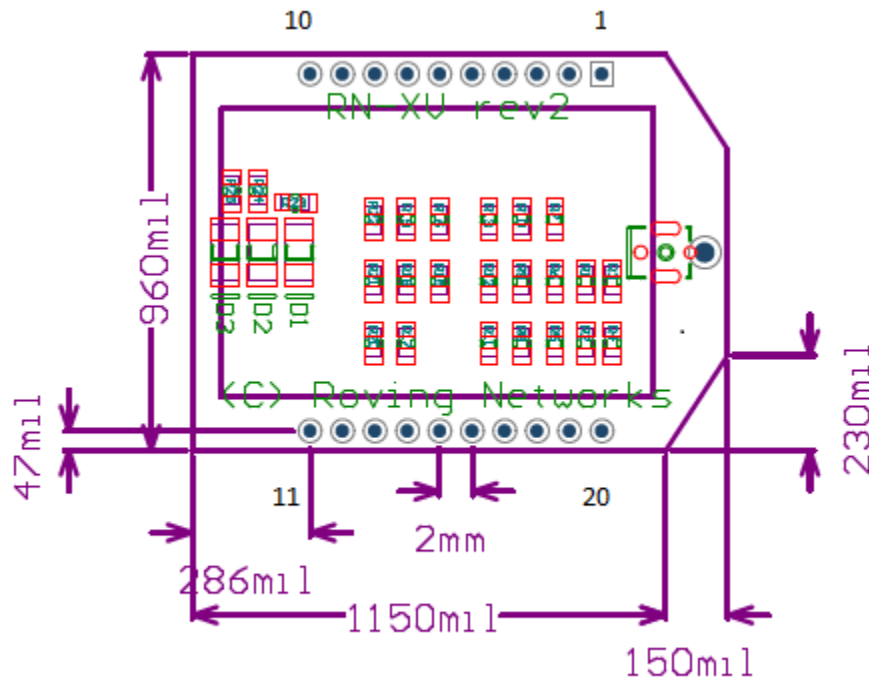
1 mil = 0.0254 millimeters

Pad Number	Signal Name	Description	Optional Function	Direction
1	VDD_3V3	3.3V regulated power input to the module		POWER
2	UART_TX	UART TX, 8mA drive, 3.3V tolerant		OUT →
3	UART_RX	UART RX, 3.3V tolerant		IN ←
4	GPIO 8	GPIO, 24mA drive, 3.3V tolerant		IN / OUT
5	RESET	**Optional** Module Reset Signal (active low), 100k Pull up, apply pulse of at least 160us, 3.3V Tolerant		INPUT
6	GPIO 5	GPIO, 24mA drive, 3.3V tolerant	Data TX/RX	OUT
7	GPIO 7	GPIO, 24mA drive, 3.3V tolerant		IN / OUT
8	Not Used	Do not connect		No Connect
9	GPIO 9	Enable Adhoc mode, Restore factory defaults, 8mA drive, 3.3V tolerant		IN / OUT
10	GND	Ground		GND
11	GPIO 14	GPIO, 8mA drive, 3.3V tolerant		IN / OUT
12	UART_RTS	UART RTS flow control, 8mA drive, 3.3V tolerant		OUT →
13	GPIO 4/SEN 6	GPIO, 24mA drive, 3.3V tolerant	Association Status	IN / OUT
14	Not Used			No Connect
15	GPIO 6/SEN 7	GPIO, 24mA drive, 3.3V tolerant/ADC input	Connection Status	POWER
16	UART_CTS	UART CTS flow control, 3.3V tolerant		IN ←
17	SENSOR 5	Sensor Interface, Analog input to module, **3.3V tolerant**		INPUT
18	GPIO 3/SEN 4	GPIO, 8mA drive, 3.3V tolerant/ADC input (**3.3V tolerant**)		IN / OUT
19	GPIO 2/SEN 3	GPIO, 8mA drive, 3.3V tolerant/ADC input (**3.3V tolerant**)		IN / OUT
20	GPIO 1/SEN 2	GPIO, 8mA drive, 3.3V tolerant/ADC input (**3.3V tolerant**)		IN / OUT

Module Schematic
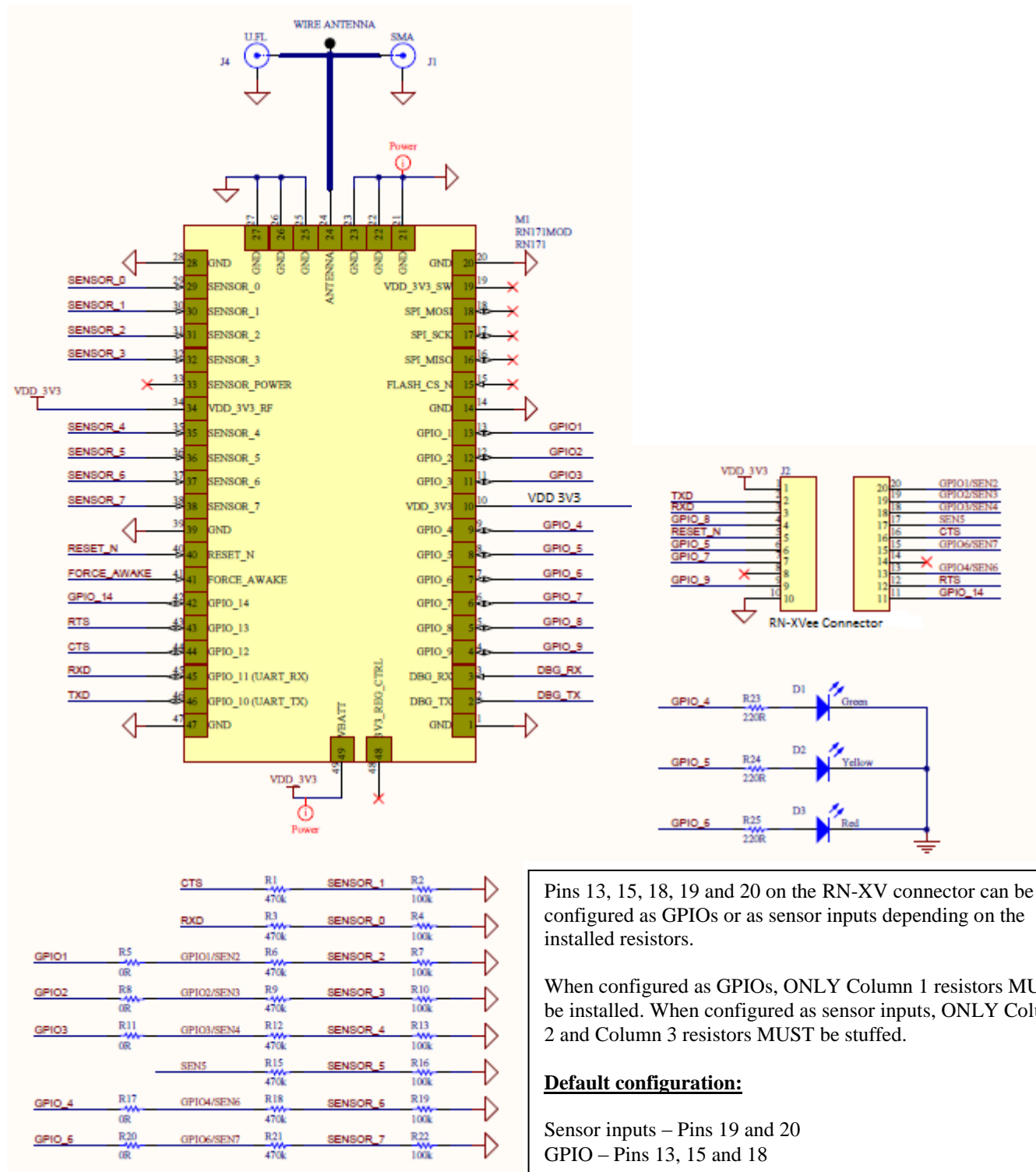
Pins 13, 15, 18, 19 and 20 on the RN-XV connector can be configured as GPIOs or as sensor inputs depending on the installed resistors.

When configured as GPIOs, ONLY Column 1 resistors MUST be installed. When configured as sensor inputs, ONLY Column 2 and Column 3 resistors MUST be stuffed.

Default configuration:

Sensor inputs – Pins 19 and 20
GPIO – Pins 13, 15 and 18

Design Concerns

1. **Powering the RN-XV module:** Apply ONLY 3.3V±10% regulated power to pin 1 (VDD) and pin 10 (Ground). The module does not have any voltage regulator on board and hence MUST be powered from a regulated 3.3V power supply.

2. **Antenna:** The RN-XV ships with a wire antenna. Custom antenna configurations such as chip, U.FL. and SMA connector are available with extended lead times

Ordering Information

Part Number	Description
RN-XV-W	Standard configuration, industrial Temperature (- 40 to + 85 C) 802.15.4 replacement solution with wire antenna
RN-XV-U*	Custom configuration, industrial Temperature (- 40 to + 85 C) 802.15.4 replacement solution with U.FL. connector
RN-XV-S*	Custom configuration, industrial Temperature (- 40 to + 85 C) 802.15.4 replacement solution with SMA connector
RN-XV-C*	Custom configuration, industrial Temperature (- 40 to + 85 C) 802.15.4 replacement solution with chip antenna
*For these configurations, contact Roving Networks directly at info@rovingnetworks.com	