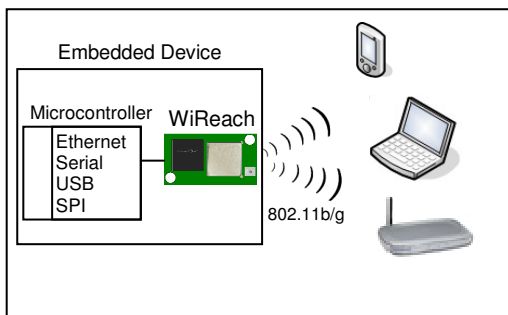# Nano WiReach™
## Miniature embedded secure WiFi module

## General Description:

Nano WiReach™ is a secure embedded Wireless LAN bridge that easily connects embedded devices to 802.11b/g Wireless LANs. It includes the iChip™ CO2144 IP Communication Controller™ chip and Marvell 88W8686 WiFi chipset. It is packaged in 33x17mm RoHS-compliant ultra-slim low profile form factor.



Nano WiReach makes adding WiFi connectivity to embedded devices a breeze. It does not require any kind of WiFi driver development on the host CPU, and its multiple interface (UART, SPI, RMII and USB) minimize the need to redesign the host device hardware.

Connect One's high-level AT+i™ API eliminates the need to add WiFi drivers, security and networking protocols and tasks to the host application.

Nano WiReach supports the SSL3/TLS1 protocol for secure sockets, HTTPS and FTPS, WEP, WPA/WPA2 (PSK and Enterprise) WiFi encryption.

Nano WiReach firmware and configuration parameters are stored in on-board flash memory. The module is power-efficient: the core operates at 1.2V, while I/Os operate at 3.3V. Power Save mode further reduces power consumption.

## Typical applications:

❖ Adding WiFi to serial embedded devices
❖ Replacing LAN cable using WiFi
❖ Adding SSL security to M2M solutions

Nano WiReach supports several operation modes:

- LAN to WiFi Bridge - allowing transparent bridging of LAN over WiFi, using direct RMII connection to existing MAC hardware or direct PHY-to-PHY connection.
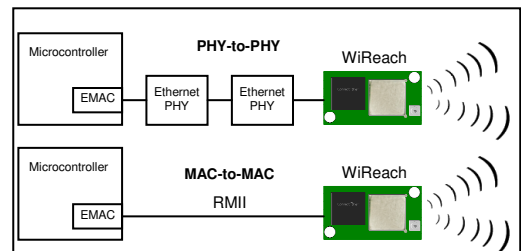


- SerialNet™ Serial to WiFi Bridge - allowing transparent bridging of Serial over WiFi, using the 3Mbps fast UART. This is a true plug-and-play mode that eliminates any changes to the host application.

- PPP modem emulation – allowing existing (e.g. modem) designs currently using PPP to connect transparently over WiFi

- Full Internet Controller mode – allowing simple MCU to use the Nano WiReach's rich protocol and application capabilities to perform complex Internet operations such as E-mail, FTP, SSL, embedded web server and others. It also acts as a firewall, providing a security gap between the application and the network.

The II-EVB-363MW evaluation board provides an easy environment for evaluating the Nano WiReach.

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# Connect One™

## Hardware Description:

- Size: 33.76 x 18.0 x 5.5 mm
- Core CPU: 32-bit RISC ARM7TDMI, low-leakage, 0.13 micron, at 48MHz
- Operating Voltage: +3.3V+/-10%
- Operating Humidity: 90% maximum (non-condensing)
- Operating Temperature Range:

| Industrial | Commercial |
|---|---|
| -20°c to +75°c | -10°c to +65°c |
| -4°F to 167°F | 14°F to 149°F |

- Power Consumption:
  - Transmit –250mA@16dbm, 235mA@12dbm (typical)
  - Receive – 190mA (typical)
  - Power Save mode – 8mA
- RF Connector: U.FL of Hirose
- Connector: Low profile 30 pin
- Host Interface: Serial, SPI, RMII and USB device.
- RoHS-compliant; lead-free

## Wireless Specifications:

- Standards supported: IEEE 802.11b/g
- Frequency: Europe – 2.412-2.472GHz
  USA – 2.412-2.462GHz
- Channels: Europe – 13 channels
  USA – 11 channels

## Performance Specifications:

- Host Data Rates:
  - UART: Up to 3Mbps
  - SPI: Up to 12Mbps
- Serial Data Format (AT+i mode): Asynchronous character; binary; 8 data bits; no parity; 1 stop bit
- Serial Data Format (SerialNET mode): Asynchronous character; binary; 7 or 8 data bits; odd, even, or no parity; 1 stop bit
- Flow Control: Hardware (-RTS, -CTS) and software flow control.

## Internet Protocols:

- ARP, ICMP, IP, UDP, TCP, DHCP, DNS, NTP, SMTP, POP3, MIME, HTTP, FTP and TELNET

- Security protocols: SSL3/TLS1, HTTPS, FTPS, RSA, AES-128/256, 3DES, RC-4, SHA-1, MD-5, WEP, WPA/WPA2 (PSK and Enterprise)
- Protocols accelerated in hardware: AES, 3DES and SHA

## Application Program Interface:

- AT+i protocol for Internet Controller mode
- SerialNET mode for transparent serial data-to-Internet bridging
- LAN-WiFi transparent bridging
- PPP operation mode for Modem-WiFi conversion

## Warranty:

One year

## Certifications:

- **Radio & EMC:**
- USA
  - o FCC Modular Approval, <u>FCC ID: XM5-SM2144N1</u>
  - o CFR Title 47 FCC Part 15, Subpart B and C
- Canada
  - o Industry Canada Module Approval <u>IC: 8516A-SM2144N2</u>
  - o Industry Canada ICES-003, RSS-Gen, RSS-210
- EU
  - o EN 300 328 (R&TTE Directive 1999/5/EC)
  - o EN 301 489 (EMC Directive 2004/108/EC)
- **Safety:**
  - o UL 60950
  - o CAN/CSA-C22.2 No. 60950
  - o EN 60950, Low Voltage Directive (2006/95/EC)

## Installation Requirements:

The Nano WiReach must be installed within a full-enclosure device that is safety certified.

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# Connect One™

## Pin Assignments:

| Pin | Signal | type | Description | Pin | Signal | type | Description |
|---|---|---|---|---|---|---|---|
| 1 | $V_{DD}$ | Power | | 16 | Readiness | Output | iChip Ready |
| 2 | GND | power | | 17 | DDP | Analog | USB device positive |
| 3 | RXD0 | Input | Uart 0 receive | 18 | DDM | Analog | USB device negative |
| 4 | TXD0 | Output | Uart 0 transmit | 19 | VDD | Power | |
| 5 | nCTS0 | Input | Uart 0 clear to send | 20 | GND | Power | |
| 6 | nRTS0 | Output | Uart 0 request to send | 21 | ETX_EN | Output | RMII Transmit Enable |
| 7 | DATA_RDY | Output | Data ready | 22 | RMII_REFCLK | Output | RMII Reference Clock |
| 8 | MSEL | Input | Mode select | 23 | CRSDV | Input | RMII Carrier sense and Data Valid |
| 9 | nRESET | Input | Reset Module. | 24 | ERXER | Input | RMII Receive Error |
| 10 | nRF_LED | Output | Rf led indicator | 25 | EMDIO | I/O | Management data I/O |
| 11 | nSPI1_CS | Input | SPI 1 chip select for host | 26 | EMDC | Output | Management data Clock |
| 12 | nSPI1_CLK | Input | SPI 1 clock for host | 27 | ETX1 | Output | RMII transmit Data 1 |
| 13 | nSPI1_MISO | Output | SPI 1 slave out for host master in | 28 | ERX1 | Input | RMII Receive Data 1 |
| 14 | nSPI1_MOSI | Input | SPI 1 slave in for host master out | 29 | ETX0 | Output | RMII transmit Data 0 |
| 15 | nSPI1_INT | Output | SPI 1 have data on his buffer | 30 | ERX0 | Input | RMII Receive Data 0 |

## Mechanical View:

All measurements are in millimeters:
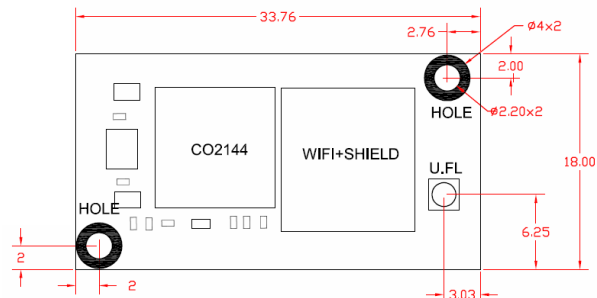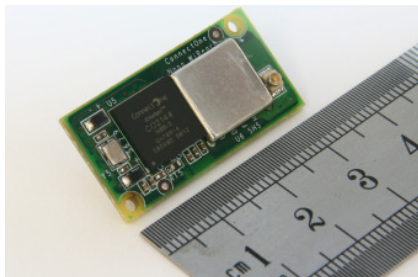


## Ordering Information

| Part Number | Description |
|---|---|
| iW- SM2144N1-US | Nano WiReach module, for USA, Industrial Temp., External Antenna |
| iW- SM2144N1-EU | Nano WiReach module, for Europe, Industrial Temp., External Antenna |
| iW- SM2144N1C | Nano WiReach module, Commercial Temp., External Antenna, for USA (configurable for Europe) |
| II-EVB-363NW-US-110 | Evaluation board for Nano WiReach module for USA, with 110V power supply adaptor, External Antenna |
| II-EVB-363MW-EU-220 | Evaluation board for Nano WiReach module for Europe, with 220V power supply adaptor, External Antenna |
| iW-CAB-150 | Miniature coaxial pigtal cable. UFL-SMA connectors. 150mm length. |
| iW-ANT2-BL | 2.4GHz WiFi antenna, 2.0dBi, 50Ω, omni-directional, 1/4 wavelength dipole configuration |