



Bluegiga Wi-Fi  
Modules



Embedded Wi-Fi modules  
for affordable connectivity

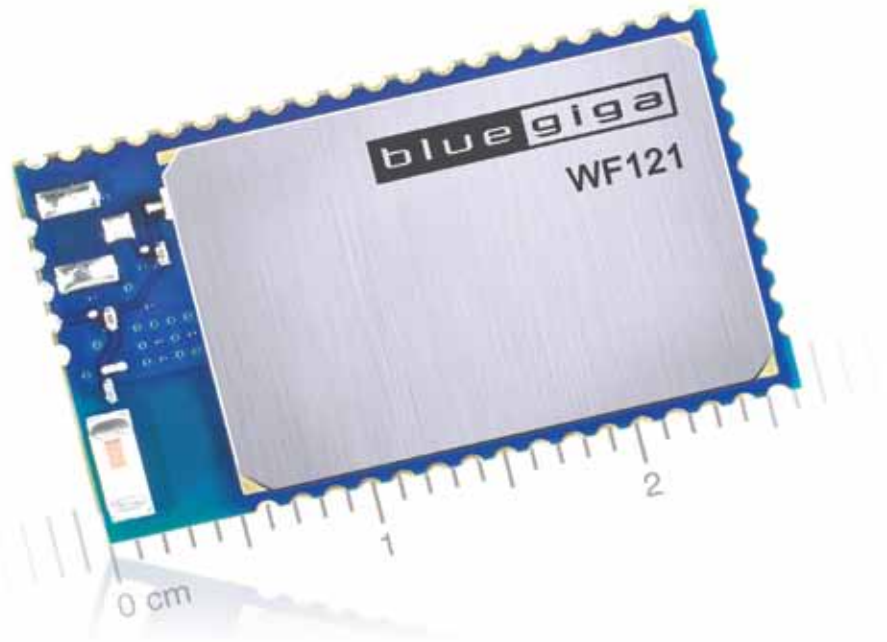
## Bluegiga WF121 Wi-Fi® Module

WF121 is a standalone programmable Wi-Fi module with integrated TCP/IP stack. It is an ideal product for embedded applications requiring reliable, simple and low-power wireless connectivity.

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[www.bluegiga.com](http://www.bluegiga.com)

# WF121 Wi-Fi Module™



Bluegiga Wi-Fi  
Software

## Key Features

- Small size: 15.4 x 26.2 x 2.1 mm
- Excellent radio performance:
  - TX power: +17 dBm
  - RX sensitivity: -91 dBm
- Host interfaces:
  - 20Mbps UART
- Peripheral interfaces:
  - GPIO, AIO and timers\*
  - I2C, SPI and UART
- Embedded TCP/IP stack on 802.11 MAC:
  - IP, TCP, UDP, DHCP and DNS protocols
- 802.11 client mode support
- 32-bit embedded microcontroller
  - 80Mhz, 128kB RAM and 512kB Flash
  - MIPS architecture
  - Bluegiga BGScript™ scripting language for stand-alone applications
- Temperature range: -40°C—+85°C
- Fully CE, FCC and IC qualified

\* check availability schedule for software support

## Description

A stand-alone Wi-Fi module providing fully integrated 2.4GHz 802.11 b/g/n radio and a 32-bit microcontroller (MCU) platform for embedded applications requiring simple, low-cost and low-power wireless TCP/IP connectivity, also providing flexible interfaces for connecting to various peripherals.

WF121 allows end user applications to be embedded onto the on-board 32-bit microcontroller using a simple Bluegiga BGScript™ scripting language - without the need for additional MCU. WF121 can also be used in modem-like mode in applications where the external MCU is needed.

With an integrated 802.11 radio, antenna, single power supply, and regulatory certifications, WF121 provides a low-risk and fast time-to-market for applications requiring Wi-Fi connectivity.

## Benefits

- Small, stand-alone 802.11 b/g/n module with radio, antenna and 32-bit MCU
- Long range provided by excellent radio performance
- Embedded TCP/IP and 802.11 MAC stacks
- On-board end user applications enabled by Bluegiga BGScript™ end user applications on-board with BGScript™
- Industrial specifications, long life time and future proof solution
- Regulatory qualifications reducing R&D risk, costs and time-to-market

Choosing Bluegiga will save your resources, time and money.



Reliable, state-of-the-art hardware



Enhanced Bluegiga software



Professional, agile technical support

## Applications

For professional applications requiring reliable, small size, stand-alone, long range Wi-Fi connectivity. Applications include: Point of Sale, automotive aftermarket, eHealth/medical, audio and many others.

### Radio and Modem

Symbol rates	IEEE 802.11n : 72.2, 65, 58.5, 57.8, 52, 43.3, 39, 28.9, 26, 21.7, 19.5, 14.4, 13, 7.2, 6.5Mbps IEEE 802.11g : 54, 48, 36, 24, 18, 12, 9, 6Mbps IEEE 802.11b : 11, 5.5, 2, 1Mbps
Modulation	CCK, DSSS, OFDM with BPSK, QPSK, 16-QAM and 64-QAM
Frequency	2.4GHz to 2.497GHz
Channels	N. America: 11 channels, Rest of the world: 13 channels

### Security

Encryption	WPA / WPA2, CCMP (AES), TKIP
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### Hardware

Host interfaces	UART up to 20Mbaud
Power supply	Single supply voltage: 3.3V
Antenna	Internal, U.FL connector
Dimensions	15.4 x 26.2 x 2.1 mm
Package	Surface mount

# Integrated Wi-Fi stack



## Bluegiga Wi-Fi Software



2014MSLG

Bluegiga Wi-Fi Software

Bluegiga's Wi-Fi® Software is an embedded implementation of IEEE 802.11 MAC and TCP/IP softwares for Bluegiga's WF121 Wi-Fi® Module. The Wi-Fi software implements full 802.11 functionality as well various TCP/IP protocols, like: TCP, UDP, DHCP, IP and ICMP.

The Bluegiga Wi-Fi® software exposes a powerful, yet easy-to-use Bluegiga BGAPI™ binary command interface to manage connectivity functions, such as Access Point discovery, associations and connection establishment hiding the complexity of 802.11 MAC operations from the end user. In order to simply and speed up development the Bluegiga Wi-Fi® software also includes a Bluegiga BGLib™ ANSI C library for various hosts systems, that implements the Bluegiga BGAPI protocol parser.

- Supports various application architectures
  - Stand-alone architecture with Bluegiga BGScript™
  - Host applications with Bluegiga BGLib™

## Description

Bluegiga's WF121 Wi-Fi® smart module provides a built-in processor run the application on addition to the Wi-Fi® software. This enabled lower cost and smaller designs to be made without the use of an external MCU. For simple application the Wi-Fi® software supports Bluegiga BGScript scripting language.

- A simple Bluegiga BGAPI™ binary command and response API
  - Low resource requirements for the host
  - Bluegiga BGLib™ C library available
  - Enables fast and simple development
- Standard Internet networking protocols included
  - No TCP/IP software required on host
- Developed by Bluegiga
  - Enables addition of new features and protocols by Bluegiga
  - Custom software by Bluegiga allows product differentiation at low risk
  - No Wi-Fi protocol knowledge or 3rd party tools needed
- On the field upgradeable

*\*Bluegiga is continuously enhancing Bluegiga Wi-Fi Software - latest software is always available at Bluegiga website*

## Key Features

- A fully embedded Bluegiga Wi-Fi software with:
  - 802.11 MAC with client mode
  - TCP/IP software with: TCP, UDP, DHCP and DNS
  - WPA/WPA2 authentication and encryption
- Enables on-board application development
- Bluegiga BGScript™ scripting support for applications
- Supports hosted architecture as well
  - Bluegiga BGAPI™ protocol over UART
  - Bluegiga BGLib™ library implementing Bluegiga API™
- Bluegiga Wi-Fi Software memory requirements:
  - 64kB RAM (total available 128kB)
  - 256kB Flash (total available 512 kB)

# Wi-Fi Modules comparison chart



	WF111	WF121
<b>Radio performance</b>		
Typical TX power	+17 dBm	+17 dBm
Typical RX sensitivity	-91 dBm	-91 dBm
Line of sight range	300-500m	300-500m
<b>Host Interfaces</b>		
SDIO	Yes	No
CSPi	Yes	No
UART	No	Yes
USB	No	Yes *
<b>Peripheral Interfaces</b>		
SPI	-	up to 2*
UART	-	up to 4*
USB	-	1xOTG*
Ethernet MAC	-	1*
I2C	-	up to 2*
GPIO	6	up to 38
AIO	-	up to 10*
<b>Microcontroller</b>		
Architecture	-	MIPS 4K
MHz	-	80 Mhz
RAM	-	128 kB (64 kB free)
Flash	-	512 kB (256 kB free)
<b>Operating voltage</b>		
Operating voltage	1.8V and 3.3V	2.7V - 3.6V
<b>Bluegiga APIs</b>		
Bluegiga BGAPI binary protocol	-	Yes
Bluegiga BGLib host library	-	Yes
<b>OS drivers</b>		
Linux	Yes	Not needed
Windows	-	Not needed
<b>Software development</b>		
On-board applications	-	Yes
Bluegiga BGScript support	-	Yes
Firmware development service	-	Yes
SDK	Linux wireless tools	Bluegiga SDK
<b>Dimensions</b>		
Dimensions (W x L x H)	12.0 x 19.0 x 2.1 mm	15.4 x 26.2 x 2.1 mm

\* check availability schedule for software support

For more detailed information please refer to a separate Bluegiga Wi-Fi modules comparison chart.

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