The Wizard Gecko WGM110 is an all-inclusive Wi-Fi® Module targeted for applications where good RF performance, low-power consumption, and easy application development, together with fast time to market, are key requirements. WGM110 has excellent RF performance and can provide long range with robust wireless connectivity.

The WGM110 Module integrates all of the necessary elements required for an IoT Wi-Fi application, including an 802.11b/g/n radio, integrated chip antenna (WGM110A) or an u.FL connector for an external antenna (WGM110E), certifications, a microcontroller, Wi-Fi and IP stacks, an HTTP server, and multiple protocols, such as TCP and UDP.

WGM110 can act as a Wi-Fi client or be used as a Wi-Fi access point, making the provisioning of the device as easy as surfing on the web. WGM110 can host BGScript™ end user applications, which means applications can be designed without relying on an external microcontroller. Alternatively, the Wi-Fi Module can run in Network Co-Processor (NCP) mode, leaving the complexity of TCP/IP networking to the Module so that the customer’s own host controller can be fully dedicated to processing the customer application tasks. The WGM110 Module also has highly flexible hardware interfaces which allows connection to different peripherals and sensors.

In addition to the Wi-Fi Module itself, Silicon Labs offers support to guide and help developers in using WGM110 to build IoT applications, enabling a quick time to market.

**KEY POINTS**
- Module variants
  - WGM110A (chip antenna)
  - WGM110E (u.FL connector)
- 802.11b/g/n compliant
- TX power: +16 dBm
- RX sensitivity: -98 dBm
- Range: up to 450 m
- CPU core: 32-bit ARM® Cortex-M3
- Flash memory: 1 MB
- RAM: 128 kB
- Modular certification
- FCC
- IC
- Japan
- Korea
- CE compliant
- End-to-end security
- Can host applications
- Small size: 21.0 x 14.4 x 2.0 mm

**WGM110 Module Block Diagram**

- **CPU and Memory**
  - ARM Cortex™ M3 Processor
  - 1 MB Flash Program Memory
  - 128 kB RAM
  - Debug Interface ETM
  - DMA Controller
- **Security**
  - HW AES Accelerator
  - AES-256/128 FIPS-197
- **Clock Management**
  - HFXO
  - 48 MHz XTAL
  - LF XO
  - 32.768 Hz XT AL
- **Energy Management**
  - Voltage Regulator
  - Voltage Regulator
  - Brownout Detector
  - Power-On Reset
- **Wi-Fi Chipset**
  - Chip Antenna (WGM110A)
  - Ext. Antenna (u.FL Connector)
  - 802.11 b/g/n
- **I/O Ports**
  - 2 x I2C
  - 2 x USART
  - USB Device
  - External Interrupts
  - GPIO
  - Reset Pin
  - Wakeup Pin
- **Timers and Triggers**
  - Timer Counter
  - Real Time Counter
  - PWM
- **Analog**
  - ADC 12-bit
  - 1 MSPS

**Available down to:**
- EM0 Run Mode
- EM1 Sleep Mode
- EM2 Deep Sleep Mode
1. Key Features

The key features of the WGM110 Module are listed below.

**Radio Features**
- **Antenna**
  - Chip Antenna: WGM110A
  - External Antenna: WGM110E (u.FL connector)
- **TX Power**: +16 dBm
- **RX Sensitivity**: -98 dBm
- **Range**: up to 450 m

**Wi-Fi Features**
- **802.11**: b/g/n
- **Bit rate**: up to 72.2 Mbps
- **802.11 Security**: WPA2/WPA Personal, WPA2/WPA Enterprise and WEP
- **STA (Station Mode)**
- **SoftAP (Soft Access Point Mode)**: up to 5 clients
- **Wi-Fi Direct**
- **WPS**: 1.0 (push-button)

**IP Stack**
- **IP version**: IPv4
- **IP multicast**
- **TCP**: client/server
- **UDP**: client/server
- **TCP sockets**: 20+
- **DHCP**: client/server
- **ARP**
- **DNS**: client/server
- **mDNS**
- **DNS-SD**
- **HTTP**: server
- **TLS/SSL**: client

**Software APIs**
- **BGAPI™** serial protocol API over UART/SPI/USB for modem usage
- **BGLIB™** host API which implements BGAPI serial protocol
- **BGScript™** scripting language for standalone usage

**Software Development Tools**
- **Free SDK**

**MCU Features**
- **ARM® Cortex-M3**
- **48 MHz**
- **128 kB RAM**
- **1 MB Flash**

**Hardware Interfaces**
- **Host interface**: UART/SPI/USB
- **Peripheral interfaces**
  - 2 x USART (UART/SPI)
  - 1 x USB (2.0 Full speed)
  - 2 x I²C peripheral interfaces
- **Up to 32 x GPIO with interrupts**
- **8-channel 12-bit ADC**
- **2 x TIMER (3 PWM's each)**
- **Real-time counter**

**Electrical Characteristics**
- **Supply voltage**: 2.7 V to 4.8 V for the radio block
- **Supply voltage**: 1.98 V to 3.8 V for the processor block

**Power consumption**
- 261 mA TX current at +16 dBm
- 81 mA RX current
- 2.4 mA associated idle consumption
- 18.8 μA deep sleep current

**Environmental specifications**
- **Temperature range**: -40°C to +85°C

**Modular certification**
- **FCC**
- **IC**
- **Japan**
- **South-Korea**

**CE Compliant**

**Dimensions**
- **W x L x H**: 21.0 mm x 14.4 mm x 2.0 mm
2. Ordering Information

This section contains cut reel (100 pcs) and full reel (500 pcs) ordering information for WGM110 Module. WGM110 Module offer a WGM110A version with integrated antenna and WGM110E version with an U.FL external antenna connector.

WGM110A1MV2 (orderable part number / cut reel) and WGM110A1MV2R (orderable part number / full reel) are the product codes for the full production (certified) version of the WGM110 Wizard Gecko Wi-Fi™ Module. The certification codes are printed on the metallic RF shield of the WGM110 Module.

WGM110A1MV1 (cut reel) and WGM110A1MV1 (full reel) are the product codes for the pre-production (non-certified) version of the Module. The only difference of the the V1 and V2 Module versions is the certification markings on the shield of the V2 version.

Note: The only visual difference between pre-production and production Module versions are the certification codes printed on the RF shield.

Silicon Labs reserves the right to deliver WGM110A1MV2 or WGM110A1MV2R (production version) for customers ordering WGM110A1MV1 (pre-production version) and WGM110E1MV2 or WGM110E1MV2R (production version) for customers ordering WGM110E1MV1 (pre-production version).

Table 2.1. WGM110 Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGM110A1MV2</td>
<td>WGM110 Wi-Fi Module with internal chip antenna</td>
<td>Packaging: 100 pcs cut reel</td>
</tr>
<tr>
<td></td>
<td>Cut reel</td>
<td>Status: Full production version</td>
</tr>
<tr>
<td>WGM110A1MV2R</td>
<td>WGM110 Wi-Fi Module with internal chip antenna</td>
<td>Packaging: 500 pcs tape and reel</td>
</tr>
<tr>
<td></td>
<td>Full reel</td>
<td>Status: Full production version</td>
</tr>
<tr>
<td>WGM110E1MV2</td>
<td>WGM110 Wi-Fi Module with U.FL antenna connector.</td>
<td>Packaging: 100 pcs cut reel</td>
</tr>
<tr>
<td></td>
<td>Cut Reel</td>
<td>Status: Full production version</td>
</tr>
<tr>
<td>WGM110E1MV2R</td>
<td>WGM110 Wi-Fi Module with U.FL antenna connector.</td>
<td>Packaging: 500 pcs tape and reel</td>
</tr>
<tr>
<td></td>
<td>Full reel</td>
<td>Status: Full production version</td>
</tr>
<tr>
<td>SLWSTK6120A</td>
<td>Wi-Fi Module Wireless Starter Kit</td>
<td>WGM110 Wi-Fi Module Radio Board</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WSTK Main Board</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expansion Board (buttons, leds, accelerometer, joystick)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessories</td>
</tr>
</tbody>
</table>
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