Silicon Labs WF121 Software Release Notes

1. Wi-Fi SW 1.5.0-93

Released on September 30, 2021.

1.1 New Features

This version includes the following new features:

- Endpoint status event will be sent when USB cable is connected and disconnected

1.2 Quality Improvements

- Improved DNS cache handling on disconnect
- Removed unnecessary warning message in WiFi GUI
- Improved data view in WiFi GUI - data from wifi_evt_tcpip_udp_data printed in data view
- Improved registry handling in WiFi GUI
- Disabled possibility to close TCP server endpoint when clients are connected
- Fixed occasional delay in connection to access point
- Added possibility to create directories on SD card from HTTP server
- Improved bulk data handling
- Improved handling of out-of-order packets in HTTP API
- Added support for 802.11n in AP mode
- Fixed overwriting of Wi-Fi off state when starting WPS session and immediately turning off Wi-Fi
- Fixed vulnerabilities related to Fragmentation and Aggregation attacks: CVE-2020-24588, CVE-2020-26140, CVE-2020-26143, CVE-2020-26144, CVE-2020-26145

1.3 API changes

New commands added:

- set_tcp_client_port_range

2. Wi-Fi SW 1.4.1-91

Released on March 27, 2018.

2.1 New Features

- This release does not include any new features

2.2 Quality Improvements

- Wi-Fi Krack vulnerability in WPA2 4-way handshake key reinstallations patch
- Added 3'rd party SW components licensing information to SDK folder

2.3 API changes

- This release does not include any changes in API

Note: File Manager and Temperature examples require latest development kit v1.3.1.

3. Wi-Fi SW 1.4.0-88

Released on December 7, 2016.

3.1 New Features

- Multicast functionality. Ability to join and leave multicast groups
- TCP source port randomization
- AP client isolation mode
- DHCP server netmask and lease time configurability
- Functionality to list the MAC and IP addresses of connected clients in AP mode
- DHCP request bootp broadcast bit is always set in Ethernet bridge mode

3.2 Quality Improvements

- DHCP server reliability and interoperability
- Bootloader RTS/CTS
- Retrieval of signal quality
- PWM functionality
- USB CDC interoperability with Windows
- USB BGAPI behavior when large events are transmitted
- USB BGAPI timeout handling
- SPI BGAPI buffering when a lot of data is transmitted
- A-MSDU interoperability with certain 802.11n/ac Access Points
- Allow usage of DNS server port when the server is disabled
- Allow usage of DHCP server port when the server is disabled
- DHCP client reliability
- Removed unnecessary TCP retransmissions
- mDNS reliability and interoperability
- Improved HTTP server response latency when using BGAPI integration
- Removed HTTP server double event if the request timeouts
- HTTP server SD card handling when writing large files
- PTK rekeying with hostapd
- Ethernet clock setting
- IP address fetching
- Wi-Fi GUI synchronization of commands and responses
- Corrected the http_serv example not showing any network problem
- Implemented an error event if set channel fails on BSSID connect
- DHCP server configure response
- Improved scan mechanism by ignoring frames from non-AP stations during scan
- DHCP server pool parsing
- SD card support for read only files and filenames with space characters
- Added reboot retry limit to wifi_dfu

3.3 API changes

- Added Client isolation support for AP mode under Wi-Fi category:
  - wifi_cmd_sme_set_ap_client_isolation
  - wifi_rsp_sme_set_ap_client_isolation
- Added Multicast support under TCP/IP category:
  - wifi_cmd_tcpip_multicast_join
  - wifi_rsp_tcpip_multicast_join
  - wifi_cmd_tcpip_multicast_leave
  - wifi_rsp_tcpip_multicast_leave
- Added functionality to list connected clients under TCP/IP category:
  - wifi_cmd_tcpip_dhcp_clients
  - wifi_rsp_tcpip_dhcp_clients
  - wifi_evt_tcpip_dhcp_client
- Added DHCP configuration functionality under TCP/IP category
  - wifi_cmd_tcpip_dhcp_configure
  - wifi_rsp_tcpip_dhcp_configure
  - wifi_evt_tcpip_dhcp_configuration

Note: File Manager and Temperature examples require latest development kit v1.3.1.

4. Wi-Fi SW 1.3.0-85

Released on June 1, 2015.

4.1 Modifications

- Only difference with previous official build is the addition of one example to the examples folder

Note: File Manager and Temperature examples require latest development kit v1.3.1.

5. Wi-Fi SW 1.3.0-83

Released on May 15, 2015.

5.1 New Features

- Hidden SSID in AP mode
- Support for 64 characters PSK in AP mode
- Perform SSID specific scan
- mDNS
- Ability to respond to DNS-SD queries
- DFU over SPI

5.2 Quality Improvements

- TCP endpoint handling improved
- Improved connection robustness with an AP
- AP mode added to system states
- Enable/Disable commands added for DHCP server routing options
- Return value added for DHCP server routing command
- Improved support for 802.11n
- Improvement in WPS robustness
- Simplified QoS handling
- Connection failure handling improved
- Improvements in Ethernet area
- Connection robustness improved by increasing beacon timeouts

5.3 Deprecated Feature

- SSL/TLS and WPA Enterprise features are removed from 1.3 SW because of technical issues.

Note: File Manager and Temperature examples require latest development kit v1.3.1.

6. Wi-Fi SW 1.3.0-76 Beta

Released on December 22, 2014.

6.1 New Features

- TLS client functionality
- WPA enterprise with PEAP/MSCHAP and EAP-TLS
- Certificate storage for server certificates
- Separate Ethernet modes for DHCP client and server modes (pure IP connectivity over wired Ethernet)
- SW support for external SD cards
- HTTP server renewed for supporting web pages and files on an internal flash and and external SD card.
- HTTP server renewed for handling web pages logic and API request directly to BGScript
- UART configuration and disabling/enabling API's
- BGScript enhancements:
  - integer-string conversion API's
  - event chaining
  - constant strings
  - BGScript now supports return statement, which stops code execution within event handler or procedure

6.2 Quality Improvements

- Low voltage detection API introduced
- External crystal, e.g., for host communication (USB, UART) configurable for project.xml

6.3 Deprecated Feature

- Bluegiga provide HTML page templates for pre-defined web pages removed as HTTP server renewed

7. Wi-Fi SW 1.2.4-73

Released on October 21, 2014.

7.1 Quality Improvements

- WPS made more robust and interoperability improved with Cisco and Linksys access points
- Association to WF121 in AP mode made more interoperable
- Possible channels in the AP mode obeying the regional settings of the network
- HTTP server quality against Internet Explorer 10 and 11 improved
- ap.html modifications not breaking HTTP server functionality
- DHCP server quality improved and IP addresses outside of default pool enabled
- Ethernet routing made more robust when the stack initialization not done by an application
- Ethernet usage with the static IP addresses possible
- FCS frames stripped away from the Ethernet RX frames for enabling the maximum MTU sizes
- SW supporting better the use cases where low voltage (less than 3V's) is supplied, see HW limitations in the WF121 data sheet
- Quality of BGAPI over SPI improved
- UART disabling enabled and UART configuration added
- UART timeout handling improved

8. Wi-Fi SW 1.2.2-63

Released on January 27, 2014.

8.1 New Features

- Support added to Connect SSID command for connecting to networks with a hidden SSID
- New API command Set transmit Size has been added that enables the TCP/UDP packet size send over an endpoint to be controlled
- DHCP Set Hostname API command added that allows the DHCP host name to be included in the DHCP response messages.
- BGScript code can now be split into multiple files with the new IMPORT and EXPORT directives. Example contained in HTTP server example.
- Scan result events now contain information if the discovered Access Point support WPS.
- in hardware configuration's bootloader tag a watchdog timer (WDTPS) configuration have been added added, which provides better control of BGAPI latency

8.2 Quality Improvements

- BGAPI over SPI reliability has been furthermore improved, e.g., usage and examples of SPI notification bit
- BGScript interrupt handling is now possible when procedures are being executed
- Sign extensions fixed for BGScript
- Reliability of WPS association and WPA authentication improved
- Connection stability with the legacy 802.11b only access points improved
- Reliability of sending extensive amount of BGAPI messages improved
- BGAPI messages buffering improved when BGScript is being executed
- Ethernet activation is now possible without running Wi-Fi at the same time
- Using ports RB10-RB13 is now possible
- Various small improvements in WIFIGUI software
- DFU functionality in WIFIGUI improved with the possibility to erase PS-keys

9. Wi-Fi SW 1.2.1-56

Released on November 5, 2013.

9.1 New Features

- AP mode enhancements added - Maximum number of simultaneous connections is now configurable.
- Ethernet support added for Ethernet to Wi-Fi bridge and Ethernet to the local IP use cases.
- WPS client push button functionality added.
- Local UDP port configuration added for the UDP.
- Memset function added for BGScripting.
- UART configuration (parity and stop bits) added.
- BGAPI command for Wi-Fi signal quality for existing connection added.
- WIFIGUI enhanced done and WIFIGUI can now be used to compile and install projects and manage the WF121 Wi-Fi Module pin configuration.
- Multiple BGScript examples added for different use cases.
- Installation package provided for the Bluegiga Wi-Fi Software and SDK.

9.2 Quality Improvements

- BGAPI over SPI functionality robustness improved.
- Multiple fixes for AP mode and HTTP server for increasing the robustness and reliability over the beta release.
- More verbose error codes added in multiple places and also error events are sent for many cases when commands wrongly ordered or used.
- UART overflow situation informed via an UART overflow BGAPI event.
- Keep-alive for AP and client modes.
- Power save mode quality improved in Wi-Fi AP mode.

10. Wi-Fi SW 1.2.0-45 Beta

Released on July 2, 2013.

10.1 New Features

- Wi-Fi (802.11) AP mode introduced.
- Lightweight customizable embedded Web (HTML) Server introduced.
- AP mode and HTTP server activation examples added.
- UDP Data event added for indicating the source of UDP data.
- Event for invalid commands and timeout for too short BGAPI commands added API.
- PS Key changes event added for monitoring the changed PS keys.
- BGScript now supports procedures.
- PS key index enumerations visible in BGScript (FLASH_PS_KEY_*)
- Error messages during script compilation improved.
- Possibility to request scan results sorted by signal strength.
- Real-time clock (RTC) support added.

10.2 Fixed Issues since 1.0.1-39

- Lost AP is detected eve if power save is enabled
- SSID connect works more reliably if connecting to a secure network w/o a passphrase
- Reconnection reliability improved during disconnecting when TCP connections open

11. Wi-Fi SW 1.0.1-39

Released on May 8, 2013.

11.1 New Features

- WEP encryption added
- API for connecting directly to an SSID added
- ADC support added
- USB DFU added
- Timer (enabling PWM usage) API added
- Script memory use (RAM & Flash) is made flexible during the build phase.

11.2 Fixed Issues since 0.4.0-29

- Sleep tag in hardware.xml handled properly
- Reliability improved when sending date to UART without flow control support
- Script shift as unsigned
- Small improvements and fixes for GUI
- FCC channel list in scanning made more reliable
- Fixed inverted logic in the tristate configuration (config.xml)
- Scanning made more reliable when repeating wifi off and on
- Earlier reported issue (When receiving the data from the module over the transparent UART with high speed, the data losses can take place rarely.) is now fixed in the official qualified WF121-A module HW.

12. Wi-Fi SW 0.4.0-29

Released on January 18, 2013.

12.1 New Features

- No new features
- Source code examples of using BGAPI over SPI is included (src_example folder)

12.2 Fixed Issues since 0.4.0-28

- SPI functioning was made reliable

12.3 Known issues (same as in 0.4.0-28)

- When receiving the data from the module over the transparent UART with high speed, the data losses can take place rarely. This issue is verified only when using UART and receiving the data from the module. The issue will be fixed in the official (non-engineering/beta) release.

13. Wi-Fi SW 0.4.0-28

Released on January 8, 2013.

13.1 New Features

- BGAPI over SPI
  - Host MCU's can use BGAPI over SPI. In this mode, the host MCU as as SPI master and the WF121 modules as SPI slave.
- BGAPI over USB
  - Host MCU's can use BGAPI over USB CDC. In this mode, the host MCU as as USB host and the WF121 modules as USB device.
  - Based on PIC32 capabilities, USB Full-Speed is supported.
- API for I2C and SPI added
  - API and capabilities for using I2C (API + end-point added) and SPI (end-point added) peripherals are added.
- API for managing the power consumption states
  - The API command and event (Set Max Power Saving State) for managing the power consumption states is added.
- Various SW profiles for throughput modes and power consumption added
  - For optimizing the throughput and power consumptions, the various SW profiles are introduced. Specified in the SW configuration guide.

13.2 Fixed Issues since 0.3.0-25

- Both UART's can be used for DFU
- Scripting optimized for less flash usage
- End-point send command returns errors if an end-point is full and not jammed.

13.3 Known issues

- When receiving the data from the module over the transparent UART with high speed, the data losses can take place rarely. This issue is verified only when using UART and receiving the data from the module. The issue will be fixed in the official (non-engineering/beta) release.

14. Wi-Fi SW 0.3.0-25

Released on November 2, 2012.

This firmware has support for standard wireless networking including security with WPA/WPA2. Multiple simultaneous TCP and UDP endpoints are supported, both server sockets or clients. GPIOs including interrupts and PIC32 I/O change notifications are supported. Simultaneous use of scripting and BGAPI is supported.

14.1 Highlights

- Power saving
  - Automated power saving for Wi-Fi both in associated and non-associated mode, no configuration needed.
  - A deeper power saving mode with inhibit pin and wake-up pin, down to 50uA with a wake-up of <10ms. This will be documented in the project and hardware configuration document.
- Throughput and start-up improvements
  - Throughput downstream is now 2.5Mbps of payload, over a TCP connection and with WPA2 encryption
  - Throughput upstream is now 3.2Mbps of payload, over a TCP connection and with WPA2 encryption
  - Throughput tests were performed with a Buffalo WHR-G300N V2 access point, with data being streamed through the transparent UART interface. The connection between the test PC and the access point was using wired Ethernet.
  - Wi-Fi subsystem start-up speed was improved, a scan can be started in less than 4 seconds after power on.
- Robustness and interoperability
  - Robustness improvements related to interoperability and disconnect cases in particular
  - Robustness improvements related to large data transfers
  - Greatly improved interoperability including iPhone AP mode support
  - Eliminated a case where the Wi-Fi subsystem would spontaneously turn off
- Wi-Fi channel handling modified
  - Provides now easier FCC compliance

14.2 Known issues

- DFU with GUI assumes 2Mbps baud rate

15. Wi-Fi SW 0.1.0-21

Released on June 8, 2012.

This firmware has support for standard wireless networking including security with WPA/WPA2. Multiple simultaneous TCP and UDP endpoints are supported, both server sockets or clients. GPIOs including interrupts and PIC32 I/O change notifications are supported. Simultaneous use of scripting and BGAPI is supported.

15.1 Highlights

- Data stalls seen in TCP transfers have been eliminated
- BGLib is included

15.2 Known issues

- Apple iPhone tethering support had to be temporarily disabled for greater interoperability with standard access points.
- Android 4.0 tethering, especially as provided by Samsung, has intermittent data stall and connectivity issues with this firmware
- DFU with GUI assumes 2Mbps baud rate
- When Wi-Fi association fails, module may stay in wrong state, requiring a reset to re-attempt connect
- Sometimes a wifi_is_off(reason=391) is seen, if you are able to reliably replicate this, please let support@bluegiga.com know.

15.3 Limitations

- Scanning while connected has been temporarily disabled
- Ethernet, I2C, SPI, USB and ADC are not supported in this release
- Ad hoc mode, Wi-Fi access point mode and Wi-Fi Direct are not supported
- Throughput, while improved (upload up to 600kbps, download up to 1.4Mbps), is still being worked on and is expected to improve further.

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