

v4.1.0.0 Release Notes

ESP32C6-AT

Documentation for Release v4.1.0.0 is available at <https://docs.espressif.com/projects/esp-at/en/release-v4.1.0.0/esp32c6/index.html>. ESP32C6-AT v4.1.0.0 is a major update for ESP32C6-AT [v4.0.0.0](#).

The firmwares:

- [ESP32-C6-4MB-AT-V4.1.0.0.zip](#)

This is the list of changes since release [v4.0.0.0](#):

Known Issues

- [AT+FS](#) may fail after repeated read/write operations

Changelog

Basic

- Added the [AT+SYSRAM](#) setup command to detail memory capacity
- Added the [AT+SYSROLLBACK](#) query command to obtain the address and version of the current and rollback firmware
- Added the [AT+RFCAL](#) command to support RF full calibration
- Added deduplication support for the [AT+SYSMFG](#) command
- Added sleep support in the BLE-only firmware
- Added support to disable sleep when Wi-Fi and BLE coexist
- Fixed an issue where [AT+SYMSGFILTER](#) did not work when the data contained `\r\n`
- Fixed an [AT+SYSFLASH](#) crash issue if read a large amount of data
- Added support for configurable UART commands

Wi-Fi

- Added the [AT+CWBANDWIDTH](#) command to set Wi-Fi bandwidth
- Added the [AT+CWCONFIG](#) command to set the global inactive time and listen interval
- Added Wi-Fi negotiated PHY-mode output
- Expand authmode range for [AT+CWLAPOPT](#), [AT+WPS](#), [AT+CWSTARTSMART](#) and [AT+BLUFI](#)
- Extended the Wi-Fi protocol range for the [AT+CWSTAPROTO](#) and [AT+CWAPPROTO](#) commands
- Fixed a station-connection failure when using [AT+CWJAP](#) after connecting to an Enterprise AP with [AT+CWJEAP](#)
- Fixed a crash when setting hostname length to 32 bytes via [AT+CWHOSTNAME](#)
- Fixed two WPA2-Enterprise connection issues
- Fixed a potential Wi-Fi issue where the device disconnected immediately after powering on and connecting to the AP
- Fixed an issue where [AT+CWLAP](#) did not return valid APs when BLUFI was enabled

- Fixed incorrect Wi-Fi reconnection behavior after sending the `AT+CWQAP` and `AT+CWRECONNCFG` commands
- Fixed a Wi-Fi disconnection issue when sending the `AT+CWRECONNCFG` command twice
- Fixed an issue where IPv6 information was output in passthrough mode
- Fixed an issue where `AT+CWAUTOCONN` did not take effect for Enterprise APs

TCP/IP

- Added a `netif` parameter to the `AT+CIPSERVER` command
- Added the `AT+CIPSSLCCIPHER` command to configure the SSL cipher-suite list
- Added a timeout parameter to the `AT+CIPSTART` and `AT+CIPDOMAIN` commands
- Enabled the SSL dynamic buffer to increase available RAM size
- Added support for a backup DNS server in `AT+CIPDNS`
- Fixed `AT+CWDHCP` returning an incorrect DHCP state after the DHCP server was disabled
- Fixed an issue where `AT+CIPRECVLEN?` always returned a fixed set of five connections
- Fixed several issues where `AT+CIPSTATUS` returned incorrect statuses
- Fixed an infinite-loop issue when the SSL server encountered a PKI read error
- Fixed some potential reconnection issues in passthrough mode
- Fixed an issue where TLS resources were not freed if TLS negotiation failed
- Fixed an issue where `AT+CIPCLOSE` could not close a connection after reaching the maximum number of open sockets
- Fixed an issue where the UDP mode in `AT+CIPSTART` did not work in passive-read mode
- Fixed an asynchronous issue with `AT+CIPRECVLEN`
- Fixed an issue where `AT+CIPSTO` did not take effect when data transmission failed
- Fixed an issue where two `CLOSED` messages were output after exiting passthrough mode
- Fixed incorrect output when a socket was readable but returned zero bytes

mDNS

- Added mDNS query support to `AT+MDNS`
- Added the `instance`, `proto`, and `txt` parameters to the `AT+MDNS` command

HTTP

- Added HTTP status-code output for HTTP commands
- Added the `AT+HTTPCFG` command to configure certificates for HTTP
- Added HTTP-header deduplication to the `AT+HTTPCHEAD` command
- Added support for configurable HTTP buffer size

MQTT

- Change MQTT message retransmission interval from 1 second to 5 seconds to improve connection stability
- Fixed a potential issue where MQTT subscribe via `AT+MQTTSUB` failed but returned `OK`
- Fixed an issue where an MQTT QoS 2 PUBREL packet might not be retransmitted

FatFS

- Added FatFS support on 2 MB flash
- Added a data-length check when writing to FatFS
- Fixed several FatFS mount and unmount issues
- Fixed a mismatch between the generated `fatfs.bin` size and the required size
- Fixed an issue where FatFS did not work if `fatfs.bin` was not pre-burned before flashing
- Fixed an issue where `fwrite()` returned `OK` but data was not written to the file system

OTA

- Enabled app rollback support
- Added compressed OTA v3 support and a sanity checker

WebServer

- Fixed a compilation error when WebSocket and info logging were enabled
- Fixed two `slist` issues where the pointer `fail_item` was used after `free`
- Fixed a potential crash when printing if the SSID length was 32 bytes
- Fixed an issue where AT-Web netconfig failed when used with the WeChat applet
- Fixed an issue where Wi-Fi did not auto-reconnect after obtaining an IP address and disconnecting while the web server was in use

WebSocket

- Added additional parameters to the `AT+WSCFG` command to configure certificates in WebSocket

Bluetooth

- Fixed AT command response interleaving issues causing data corruption
- Fixed BLE not working in silence firmware on esp32c6
- Fixed AT command response issues where the `\r` character was missing
- Added BLE light sleep support on esp32c6
- Added BLE adv type information
- Fixed missing `+BLESCANDONE` issue
- Resolved data loss issue in BLE passthrough mode
- Optimized BLE WRITE/INDICATE flow control mechanism
- Fixed crash in BLE transparent transmission mode
- Fixed `AT+BTENCCLEAR` not properly clearing BT pairing information
- Fixed `BLE_TT_MODE` printed twice in BLE passthrough mode
- Fixed missing `+WRITE` response
- Fixed `BLUFI` memory leak
- Fixed issue where MTU size greater than attribute length caused data transmission failure
- Fixed `AT+RFPPOWER` query not returning BLE power when using nimble protocol
- Fixed extra `+BLEDISCONN` message issue when sending `AT+BLEDISCONN=0`

Interface

- Optimized the UART1 clock source
- Fixed a potential crash when AT was not ready but received data

- Fixed a potential UART voltage fluctuation during light sleep
- Fixed some socket interface issues
- Fixed an SDIO compilation warning
- Fixed a heap-corruption issue when using the SDIO interface

System

- `esp-idf` version updated to ~v5.4.2
- Added an unfilled factory binary
- Added a checker to prevent duplicate keys in `*.defaults`
- Added some return value checks for driver commands
- Added `pre_wakeup_callback` and `process_light_sleep` hook events
- Added a hook function for memory allocation failure
- Added the `esp_at_ready_before()` API to perform tasks before ESP-AT is ready
- Added the `at_exe_cmd()` API to execute AT commands via ESP-AT itself
- Added more prompt messages during compilation
- Reorganized the main directory of the ESP-AT repository
- Supported the new log system and improved log readability
- Added support to use an external `module_config` to override the internal one
- Added support for AT command overrides
- Added support to configure the default system storage mode
- Added support to print the firmware source
- Added support to override default configurations
- Optimized resources to increase available RAM
- Reduced power consumption when a beacon is lost
- Optimized the root CMake file
- Decoupled Wi-Fi and BLE functions from the base commands
- Updated the license and code style to satisfy `pre-commit` checks
- Renamed `esp_at_get_netconn_count()` to `esp_at_get_netconn_max_count()`
- Exposed `esp_at_get_smartconfig_start_config()` API
- Reconfigured TWDT to disable the panic trigger when AT debug is enabled
- Provided some weak symbols to allow external overriding (`esp_at_nvs_set_xxx/esp_at_nvs_get_xxx/esp_at_log_write`)
- Fixed an issue where the factory binary was not generated in some cases
- Fixed an issue where patches could not be applied on Windows
- Fixed several MCU wake-up issues
- Fixed a compile error if no internet
- Fixed the issue where AT cannot work immediately after restart and prompt ready

Optimization

- **TCP & SSL:** TCP/SSL connections are now proactively closed immediately when their associated netif state changes (netif down, stop, or lost IP). In previous versions, the connections would remain open until a keep-alive timeout, send timeout, or max retry threshold was reached - often taking tens of seconds to close. This change significantly reduces latency in connection teardown and improves system responsiveness.
- Added debug options to allow different levels of ESP-AT debug output

- Upgraded supported Python version and some package versions
- Optimized patching process
- Replaced the previous script with `esptool.py merge_bin`
- Fixed a potential issue where the patch is applied multiple times
- Fixed an issue where `gatts_cfg` was excessively modified by the `at.py` script

Examples

- Added a `fatfs_to_http_server` example
- Added a `http_get_to_fatfs` example
- Added a WebSocket example document
- Added an AT interface security example

Documentation

- Improved documentation for AT commands, examples, and development
- Added richer content for new features and changes
- Added a chatbox on docs.espressif.com/projects/esp-at
- Added a disclaimer for the esp-at project
- Added document format checks