Ameba Release Note

SDK release note

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1 Release v3.0

1.1 v3.0a
- First release for 8195a

1.2 v3.0c
- Fix WPS and long PassPrhase issue

2 Release v3.1

2.1 v3.1a
- Support EVB 2V0

2.2 v3.1b
- add examples: crypto, i2s, flash, nfc, pw_deepsleep
- update flash layout document: UM0034

3 Release v3.2

3.1 v3.2a
- add examples: pw_deepstandby, pw_sleep, watchdog, timer, adc(analog_in), uart_irq,
- wlan: support concurrent mode. support fast reconnect.
- evb: support 8195a 3v0 evaluation board (jlink).

3.2 v3.2b
- Fix SPI clock rate issue
- Update example of disabling uart log before entering deep Sleep Mode
- Update I2C block read api

3.3 v3.2c
- Modify heap size from 75KB to 70KB

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3.4 v3.2d

- Update for tool chain

4 Release v3.3

4.1 v3.3a

- Add peripheral example :
  - gtimer_rtc,
  - spi_stream_twoboard: SPI DMA mode
  - uart_clock: use uart to generate clock
- Add peripehral device examples:
  - i2c_epl2197_heartrate: heart rate sensor
  - i2c_epl2590_light: light Sensor
  - i2c_epl2590_proximity: proximity Sensor
  - i2c-shtc1: humidity and temperature Sensor
  - pwm-buzzer: PWM buzzer
- Add application example
  - wlan_fast_connect example
  - multicast example
  - mdns example
- I2S: api is modified in order to enhance performance.
- Wlan:
  - enhance AP mode throughput
  - support unassociated idle, associated idle power save
- LwIP: upgrade to LwIP 1.4.1
  - Standard library: update standard library

4.2 v3.3b

- Fix issue of cannot load image

4.3 v3.3c

- Fix WPS library
- Add simple config wizard lost library

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5   Release v3.4

5.1 v3.4a

- Power Save
  - Provide power save mode to switch system between ON and Sleep dynamically and automatically.
  - example: pm_tickless
  - Doc: AN0045 for detail discussion

- WLAN
  - Connection Indication
    - Support indication event of a STA association to Ameba AP
    - Please check wext_wlan_indicate, Running as AP mode.
  - Auto Connection after disconnect
    - Add an API for developer to decide retry time and timeout if wlan is disconnected.
    - API: wifi_config_autoreconnect
  - Fast Connect
    - Fix AES connect fail if key length is 13
    - Fix WEP connect fail for different key id
    - Change fast-connect flash area to prevent confliction with OTA address. (this address should finally be customized by developer according to their flash layout)
  - LwIP
    - Fix LwIP issue to solve hardfault issue.

- USB Video
  - Support USB camera software stack. It is able to use VLC on Windows/Android/iPhone to get video stream from Ameba.
  - Doc: AN0050
  - **It requires special guide** to turn on this function in SDK. Please contact FAE or agent for help.
  - Only several camera modules are included in supported vendor list, please contact FAE or agent for help. Before activation, please contact agent to apply for USB camera.

- Wi-Fi RS232, UART Adapter application
  - Support putting system in sleep mode and can be wake up by UART RX.

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- ■ It is required to use PA_7/PA_6, which is different from previous SDK.
- ■ Doc: AN0046 and AN0045

- ● WiGadget Application
  - ■ Provide an example to setup a sensor/control application quickly.
  - ■ Sample code for both device code and Android app are provided.
  - ■ Sample code for both local control and remote control are provided.
  - ■ Doc: AN0049

- ● mDNS lib
  - ■ In previous version, mDNS lib is located in SDRAM by default. For this version, developers can locate it in SRAM is required by modifying linker. Please check document in detail
  - ■ Doc: AN0043

- ● Simple Config
  - ■ Improve successful rate
  - ■ Both libary for Ameba device and Android/iOS app are updated
  - ■ Fix Hardfault if running wifi_connect and simple config at the same time. (although it is not correct control flow)
  - ■ Fix the issue of simple config fail in open mode with under certain flow.

- ● Efuse
  - ■ Add example for using efuse. There are limited efuse storage, so
  - ■ Please be caution when you decide to test efuse function. It is suggested to make a plan at first.
  - ■ Example : example_sources\efuse_user\

- ● Google Nest
  - ■ Google Nest Server changes its behavior, so modify implementation accordingly.

- ● GPIO
  - ■ GPIO and Jtag
    - ◆ Add an example to disable jtag and config it as general gpio pin
    - ◆ Example: example_sources\gpio_jtag
- ● Boot
  - ■ Fix flash calibration fail under some special condition

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- ■ Change start address of image 2

- ● Application Example
  - ■ SSL download large file (such as firmware)
    - ◆ It is usually used in OTA procedure
    - ◆ Example: component\common\example\ssl_download
  - ■ Socket Select
    - ◆ Example: component\common\example\socket_select
  - ■ XML parser/generator
    - ◆ Example: component\common\example\xml

- ● Crypto Engine
  - ■ AES
    - ◆ Support AES-CBC and DES-CBC larger than 16000

- ● OTA
  - ■ Add checksum feature
  - ■ When using IAR to generate ota.bin, it appends checksum information at the end of image. Program downloads ota.bin from the internet and compares checksum value at the end.
- ● UART
  - ■ UART socket
    - ◆ Use select function for UART send and receive
    - ◆ Example: component\common\utilities\uart_socket.[c/h]

5.2 v3.4b
- ● Wlan
  - ■ Provide interface to control wi-fi power save mode and adjust DTIM time slot. Please check wifi_set_power_mode, wifi_set_lps_dtim.
  - ■ Provide proper api for regulatory domain setting.
  - ■ Fix long run disconnect issue in 3.4a
  - ■ Fast Connect
    - ◆ Fix the issue of non-initialized content of channel field in flash causes scan fail.
    - ◆ Enable auto connect after fast connect.
  - ■ Adaptivity
    - ◆ Add api to enabling adaptivity.
  - ■ Isolate wlan and wps library to be os independent

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- System power save
  - Log uart tx should be pulled up before entering sleep mode to prevent from the receiving peer misunderstanding this kind of situation as TX start.
  - Support option for do not disable log uart during system sleep.
- GPIO
  - Fix the issue of gpio port is disabled if the gpio share same pin with corresponding peripheral and the peripheral is disabled.
  - Add gpio level trigger example to represent how to detect both high and low triggered gpio
    - example_sources/gpio_level_irq
- I2C
  - Update peripheral example to allow reading data more than 16 bytes.
- USB camera
  - Separate USB camera stack to several libraries.
  - Support more sets of USB camera
- OTA
  - Fix the issue of unable to do ota under the configuration of older bootloader and new ota image.
  - Update image checksum execution code for both winx86 and winx64 platform.
- File checksum tool
  - Provide a md5 file check sum tool
  - tools\file_check_sum.c
- Flash
  - Support new type of flash.
- Application
  - UART Adapter
    - Fix compiler error.
- Other
  - Fix hardfault caused by reusing of GPIO control related memory as heap space.
  - Fix compiler warning under IAR 7.40.
  - Do not show sdram init warning message for 8711AF
- Document
  - UM0014: Fix some typo.
  - UM0023: Add description for how to disable CMSIS-DAP.
  - UM0034: Add instruction for how to place data in sdram.

5.3 v3.4b2

- Wlan
  - Patch: lib_wlan.a, lib_wlan_mp.a
  - Patch: wifi_conf.c, wifi_util.[c/h]. (only if adaptivity feature is required)
  - Compatibility issue with one AP under AES mode
  - Add API for adaptivity mode and threshold.
  - Revise channel plan to improve tx power of channel 12, 13 in WW13.(Excluding FCC power limit for channel 12, 13)
  - Add Channel plan FCC2, MKK2 and Global.
  - Fix RX packet fail if RDU happened.
  - Fix TPLINK AP disconnect issue in power save mode.

5.4 v3.4b3

- Wlan
  - Patch: lib_wlan.a, lib_wlan_mp.a
  - Fix memory leak when continuously connect to encrypt AP.
  - Improve stability of wlan long run under power save. RF is off under some condition.
  - Improve stability of wlan long run under power save. One Netgear AP send deauth to STA under low traffic.
  - Update PHY parameter from v19 to v21.
  - CCK FA counter in MP mode. (wlan mp lib)
  - Fix ping loss in concurrent mode because PHY ODM excute twice in 2 seconds.
  - Add channel plan "Global"
- FreeRTOS
  - Patch: osdep_service.h [MUST]
  - Should open USE_MUTEX_FOR_SPINLOCK in freertos_service.c to enable spinlock protect for wlanlib.
- Toolchain
  - Patch: platform_lib.a
  - Support IAR 7.5
- OTA tool
  - Patch checksum.exe
  - Fix image checksum calculation incorrect that may lead to OTA fail

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6 Release v3.5

6.1 v3.5a

- Wlan
    - [Fix] Strengthen stability long run for association idle mode.
    - [Fix] Improve DHCP procedure.
    - [Fix] Fix memory leak in scan command.
    - [New] Add command to get driver capability.
    - [New] Add flash access protection for fast connect data storage.
    - [New] Get sta info in AP mode.
    - [New] API for hidden ssid in AP mode
    - [New] API for disassociate a sta
    - [New] API/example to get current connected beacon content
    - [New] API to set channel plan in normal driver mode. wifi_set_channel_plan().
    - [Update] Normal driver checks K-free according to effuse.
    - [Update] Report matched ssid on during scan with ssid procedure.
- Lwip
    - [Fix] handle dhcp renew by default.
- Power Save
    - [Fix] 8711AF doesn't have SDRAM, so suspend/resume SDRAM cause device hang.
    - [Fix] The UART interrupt may cause sleep fail. Fix it by disable interrupt when enter sleepCG.
    - [New] Tickless: Extend wake lock module from one to 32 hardware device.
    - [New] Tickless: Support options that not to suspend sdram intickless. Please check flag FREERTOS_PMU_TICKLESS_SUSPEND_SDRAM.
    - [Update] Force to put stack of idle task in SRAM. To put idle task in SDRAM cause system hang because of incorrect power sequence.
- Simple config
    - [New] Simple config version 2. To reduce the condition that AP does not forward packets.
    - [fix] Improve 40MHz send/receive during simple config
- Multimedia
    - RTSP: Update RTSP library
    - Multimedia framework : New mmf middleware for streaming application.
    - UVC: Update UVC library
    - USB camera: Do not filter out unrecognized camera on 3.5 version.

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- Storage Application
  - SD interface storage/file system. Create/Open/Delete/Save data. For detail please check UM0073.
  - USB mass storage class. Ameba act as a USB device class, and data is input from usb interface and stored in SD card. For detail please check UM0073.
- UART Adapter
  - [New] Add TCP socket auto-connect after reboot.
- UART
  - [New] Provide new set of API to control log uart usage
  - [Update] Uart flow control
- Efuse
  - [New] Add efuse api and provide example. Please check example_sources\efuse_mtp and example_sources\efuse_otp
  - [New] Add efuse api read/write lock to prevent from writing error under multiple thread access.
- I2C
  - [Fix] example_sources/i2c: Initialize I2C structure
- SPI
  - [New] example_sources/spi_stream_twoboard : support tx/rx concurrent mode
- RTC
  - [Fix] example_sources/rtc: fix ctime() and wait() function fail in RTC example code.
- PWM & Gtimer
  - [Fix] Modify gtimer mapping to prevent from some PWM conflict with timer using by wlan
    - ◆ Support gtimer 0,1 IRQ handler.
    - ◆ Change PWM0~3 gtimer from 3~6 to 2~5. PWM[0,1,2,3] -> Timer[3,4,5,2]
    - ◆ Change RTC gtimer from 7 to 0.
- Gpio
  - [new] Add gpio_level_irq example
- Flash
  - [new] Add lock for flash r/w. device_mutex_lock(RT_DEV_LOCK_FLASH);.
- Ethernet
  - [new] Add Ethernet api
- Network Stack
  - [Fix] ssl_download example
  - [New] Add example for client/server authentication.
  - [New] Example for SNTP. Add example_sntp_showtime.c .

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- Others
  - [Fix] Update NFC firmware.
  - [Update] Add more function and save up to 40KB sram
  - [Update] Move thread stack of log service and TCPIP to TCM to save SRAM usage.
  - [Update] Use heap_5.c instead of heap_4.c. Heap_5.c allows the heap to span multiple non-contiguous regions.
  - [Update] Update flash loader in IAR.
    - ◆ When executing erash flash in IAR, do not clear system data and calibration data section.
  - [New] Provide a method to disable message output from printf
    - ◆ Set disablePrintf = TRUE low_level_io.c
  - [New] rtl_vprintf and rtl_vsnprintf
  - [New] Support AT command v2. Detail in AN0075
  - [New] Support firmware update through UART. Detail in AN0096
- Feature
  - Multimedia Frame Work
    - ◆ [New] Provide many audio/video examples.
- Document
  - [Update] UM0034. Provide methodology for how to use SDRAM

6.2 v3.5b

- Wlan
  - [Update] Improve P2P connection stability.
  - [Update] Improve association idle stability with some specific AP.
  - [Update] Optimization for adaptivity test.
  - [New] Add API for cancel WPS session
- Lwip
  - [fix] interoperability with one specific AP. Hardfault fixed.
- Simple config
  - [Fix] Improve ipteroperability
- Efuse
  - [Fix] Enlarge efuse programming successful rate during mass production.
- I2S
  - [Update] Move audio driver to common parts.
- Flash
  - [Update] Lower Flash operation frequency for stability for some flash type.
- Ethernet

- ■ [Update] Optimize Ethernet initialization flow.
- Network Stack
  - ■ MQTT
    - ◆ [New] Add MQTT example
  - ■ SSL
    - ◆ [New] Add SSL server sample
- Others
  - ◆ OTA
    - [Update] Move ota code from common to soc specific.
    - [New] Support flash read back check
    - after OTA accomplished.
    - [New] Example for OTA over http
  - ◆ Firmware update through UART
    - [Update] Check flash content after upgrading firmware through UART
  - ◆ Http download example
    - [Update] Refine timeout behavior
- Feature
  - ■ SPI at command v2
    - ◆ [New] AT command over SPI interface. Ameba is SPI master. component\common\example\spi_atcmd
  - ■ Airkiss
    - ◆ [New] Support AirKiss2.0
  - ■ UART at command v2
    - ◆ [Fix] Fix DCHP issue under AP mode
  - ■ GoogleNest
    - ◆ [Update] Update client behavior according to google nest server
  - ■ QQLink
    - ◆ [Update] Adjust connecting cloud server address, due to the old address is abolished.
  - ■ HTTP client/daemon
    - ◆ [New] Support http client/demon. Please refer to api document in doc\api_doc.htm, example is also supported.
- Document
  - ■ [Update] Peripheral api document in doc\api_doc.htm

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7 Release v4.0

Both Ameba-1 and Ameba-Z are supported from version greater than 4.0.

7.1 v4.0a

- Wlan
  - Ameba-1/Ameba-Z
    - [Critical Fix] Fix packet fails to send out if AP's IP address is 192.168.43.x. Android hotspot use 192.168.43.x. (existing in 3.5b only)
      - Patch is available for 3.5b: 3.5b_patch_fix_android_hotspot_issue_(v01)
    - [Fix] Enhance WPS stability & interoperability.
    - [Fix] 4-way handshake fail under one special corner case with one AP. Hardfault fixed
    - [Update] Support channel plan WW2.
    - [Update] Support ping IP in external network
    - [New] WEP key error indication event
    - [New] Provide API "wext_set_sta_num() " to support limited STAs number for AP mode.
    - [New] Support EAP supplicant
    - [New] API for AP's bssid wext_get_bssid()
    - [New] Support WPS multiple credential
    - [New] Support WPS2.0
    - [New] Support STA timeout mechanism in AP mode. Please check CONFIG_ENABLE_AP_POLLING_CLIENT_ALIVE for detail.
- Simple config
  - Ameba-1/Ameba-Z
    - [Update] Improve simple config v3
- Power Save
  - Ameba-1/Ameba-Z
    - [Update] Adjust tickles API to support both Ameba-1/Ameba-Z
- Multimedia
  - Ameba1
    - [New] Playback MP3 file in sd card. Ameba-1 only
    - [New] Streaming MP3 from RTSP server. Ameba-1 only
- I2S
  - Add driver for audio codec sgtl5000
- Ethernet

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- ◆ Ameba-1
  - ● [Fix] Fix routing error under fixed IP configuration
- ● Network Stack
  - ■ Ameba-1/Ameba-Z
    - ◆ WebSocket
      - ● [Fix] fix memory leak on some condition
    - ◆ HTTP Server
      - ● [Update] Add some interface API
    - ◆ Ping
      - ● [Update] Support ping with domain name
    - ◆ DHCPc
      - ● [Fix] Fix DHCP release
    - ◆ DHCPs
      - ● [Fix] Fix interoperability with iPhone SE
    - ◆ QQLink
      - ● [Update] Lib update
    - ◆ Airkiss
      - ● [Update] Update to new version
  - ■ Ameba-1
    - ◆ mbedTLS
      - ● [New] Support mbedTLS. It is suggested to stay PolarSSL in Ameba-Z for memory consideration.
    - ◆ PolarSSL
      - ● [Update] Speed up connection time
- ● Others
  - ■ Ameba-1/Ameba-Z
    - ◆ OS API Suggestion
      - ● [Update] For new users, please use osdep_service.h in folder component\os\os_dep
      - ● [Update] For old uses, suggest replace osdep_api.h with osdep_service.h
      - ● [Update] move osdep_api.h code to component\soc\realtek\8195a\misc\os
    - ◆ OTA
      - ● [Update]add the solution for the scenario that the size of http header over the buffer size
    - ◆ Toolchain
      - ● [Update] Support IAR 7.8

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- Feature
  - Ameba-1/Ameba-Z
    - ◆ [Update] Airkiss 2.0
    - ◆ [Update] Support SSID with UTF-8 format such as Chinese character.
    - ◆ [New] AWSIoT
    - ◆ [New] DCT, Device Configuration Table for variable data management
      - component/common/example/dct
- Document
  - Ameba-1/Ameba-Z
    - ◆ [Update] API document update.

7.2 v4.0b

- 4.0b version id is not used

7.3 v4.0c

- Wlan
  - Ameba-1/Ameba-Z
    - ◆ [Update] Improve WPS interoperability and stability
    - ◆ [New] Example for wifi roaming
    - ◆ [Update] Update wlan for KRACK vulnerability.
  - Ameba
    - ◆ [Update] Fix wlan mp binary build error
  - Ameba-Z
    - ◆ [Update] Update tx power limit table for FCC
- ADC
  - Ameba-1
    - ◆ [New] Support random seed generation via ADC. Only for 8195AM and 8711AM
  - Ameba-Z
    - ◆ [New] Support random seed generation via ADC
- UART
  - Ameba-1
    - ◆ [Fix] Fix the usage scenario of mixing IRQ and DMA mode
    - ◆ [New] Add example for UART Tx/Rx concurrent condition
- USB
  - Ameba-1
    - ◆ [Update] Increase USB buffer size for to improve mass storage performance
- Network

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- ■ Ameba-1/Ameba-Z
    - ◆ HTTPS
        - ● [Update] ADD SNI extension to httpc tls handshake. Please check example for httpc and httpd
    - ◆ COAP
        - ● [New] Support Coap
    - ◆ MQTT
        - ● [New] Add MQTT example
    - ◆ Alink
        - ● [New] Add Alink 2.0. Support SDS test
    - ◆ LwIP
        - ● [New] Support MTU adjustment under ICMP unreachable condition.
    - ◆ mDNS
        - ● [Update] Fix buffer overflow when receiving some mDNS type packet with long length.
- ● Multimedia
    - ■ Ameba-1/Ameba-Z
        - ◆ Codec
            - ● [Upate] Update mp3 decoder.
- ● Power Save
    - ■ AmebaZ
        - ◆ [Upate] Add sleep interval API for user to fine tune wake lock
- ● Other
    - ■ Ameba-1/Ameba-Z
        - ◆ Example
            - ● [Update] Fix header parsing error in example_html_download and example_ssl_download with some specific server.
        - ◆ Audio driver
            - ● [Update] Add ALC5616/ALC5660/ALC5680 audio driver
        - ◆ Simple Config
            - ● [Update] Update Simple Config APP to v304
    - ■ Ameba
        - ◆ Boot
            - ● [New] Update flash size check during boot procedure
        - ◆ Memory
            - ● [New] Add API to allocate memory from sram
    - ■ Ameba-Z

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- ◆ OTA
  - ● [Update] OTF usage
  - ● [Update] Fix hardfault during OTA with one specific server.
- ◆ BSP
  - ● [Fix] Fix OSC 8M calibration fail
  - ● [Update] Add OTF mask configuration
- ◆ main.c
  - ● [Update] Remove crypto init in general main file to prevent from linking unnecessary code
- ◆ Tickless
  - ● [Update] Improve tickles mode stability
- ◆ Security
  - ● [Update] Add efuse API for RDP
- ◆ Flash
  - ● [Update] Support new flash type FM25Q08A
- ◆ MP
  - ● [Fix] Close IPS in mp mode.
  - ● [Fix] Get TX power in mp mode
- ● Tool Chain
  - ■ Ameba-1/Ameba-Z
    - ◆ [Update] Support IAR 8.11