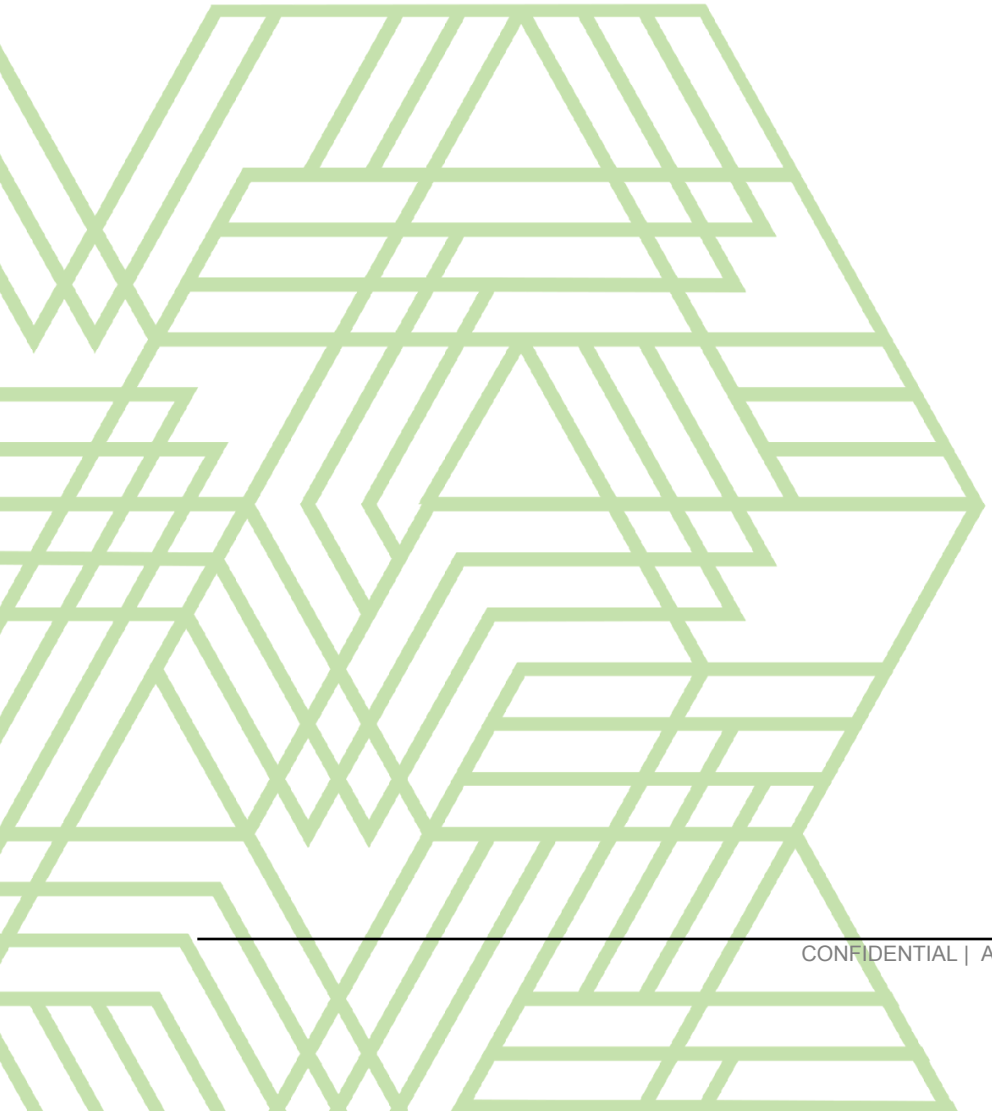
Atmosic SDK 6.0.0 Bluetooth LE

Release Notes

SUMMARY: This document provides the release notes for Atmosic SDK 6.0.0 Bluetooth LE and associated tools and utilities enabling the design and development of solutions based on ATM2/3, ATM33/e, and ATM34/e Wireless SoC Series. It lists the new features and known issues for this SDK release.



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Acronyms and Abbreviations

Acronyms	Definition
API	Application Interface
ATM2	ATM2201 ATM2202 ATM2221 ATM2231 ATM2251
ATM3	ATM3201 ATM3202 ATM3221 ATM3231
ATM33	ATM3330 ATM3325
ATM33e	ATM3330e
ATM33/e	ATM33/ATM33e
ATM34	ATM3405 ATM3425
ATM34e	ATM3430e
ATM34/e	ATM34/ATM34e
ATMWSTK	Atmosic (ATM)Wireless Stack
ATT	Attribute Protocol
CTE	Constant Tone Extension
DMIC	Digital Microphone
DTM	Direct Test Mode
EATT	Enhanced Attribute Protocol
EVK	Evaluation Kit
FW	Firmware
GATT	Generic Attribute Profile
GAP	Generic Access Profile

Acronyms	Definition
HCI	Host Controller Interface
HID	Human Interface Device
IDE	Integrated Development Environment
MSAP	Monolithic Stack & App Package
MTU	Maximum Transfer Unit
NSPE	Non-Secure Processing Environment
NVDS	Non-Volatile Memory
OTA	Over-The-Air
OS	Operating System
QSPI	Quad Serial Peripheral Interface
RCU	Remote Control Unit
RF	Radio Frequency
SDK	Software Development Kit
SMP	Secure Manager Protocol
SPE	Secure Processing Environment
SPI	Serial Peripheral Interface
SoC	System-on-Chip

1. Purpose

This release note provides details of features introduced as part of the Atmosic SDK 6.0.0 BLE release. Please refer to the README or SDK User Guide for installation instructions.

1.1 Development Platforms, IDE, and Tool Chains

This section listed the OS and debug tools supported:

Category	Features Supported
Development Platforms	Windows 10/11
IDE	IAR Workbench (v9.32.2.57414)
Debug Tools	J-Link Debugger (on-board for ATM33/e and ATM34/e EVKs)
	OpenOCD debug
FW Update	OTA FW Update

Please visit the Atmosic Support website for the following documents:

Title	Document Number
SDK User Guide	6844-xxxx-xxxx

Additional references for developing applications using third-party IDE Software:

Title	Document Number
IAR Workbench User Guide	4247-xxxx-xxxx
IDE Auxiliary Flash Programming Tool User Guide	4381-xxxx-xxxx

2. List of Supported Devices, Platforms, and Features

SDK and application versions are displayed as part of the boot-up messages:

@00000575 SDK Version: 6.0.0

@000005e1 APP Version: 0.0.0.1

- SDK version is located in the version.h folder in <ROOT>/AtmosicSDK
- App version can be specified using `APP_VERSION` defined during the make

2.1 Supported Devices

This release combines the support for all the Atmosic SoC Series - ATM2, ATM3, ATM33/e, and ATM34/e.

ATM2	ATM3	ATM33/e	ATM34/e
ATM2201-x1x	ATM3201-x1x	ATM3330e-5DCAQN	ATM3430e-2WCAQN
ATM2202-x1x	ATM3202-x1x	ATM3330-5DCAQN	ATM3425-2PCAQK
ATM2221-x1x	ATM3221-x1x	ATM3325-5DCAQK	ATM3405-2PCAQK
ATM2231-x1x	ATM3231-x1x	ATM3325-5LCAQK	
ATM2251-x1x		ATM3325-5DCACM	

2.2 Supported Platforms

This Atmosic SDK 6.0.0 supports the following EVK platforms:

EVK	Kit Part Number	Board Configuration
Evaluation Kit for ATM2201	ATMEVK-M2201-02	ATMEVK_M2201
Evaluation Kit for ATM2202	ATMEVK-M2202-02	ATMEVK_M2202

Evaluation Kit for ATM2221	ATMEVK-M2221-02	ATMEVK_M2221
Evaluation Kit for ATM2231	ATMEVK-M2231-02	ATMEVK_M2231
Evaluation Kit for ATM2251	ATMEVK-M2251-01	ATMEVK_M2251
Evaluation Kit for ATM3201	ATMEVK-M3201-02	ATMEVK_M3201
Evaluation Kit for ATM3202	ATMEVK-M3202-02	ATMEVK_M3202
Evaluation Kit for ATM3221	ATMEVK-M3221-02	ATMEVK_M3221
Evaluation Kit for ATM3231	ATMEVK-M3231-02	ATMEVK_M3231
Evaluation Kit for ATM3325	ATMEVK-3325-QK-6	ATMEVK_3325_QK
Evaluation Kit for ATM3325 with Extended Storage	ATMEVK-3325-LQK-6	ATMEVK_3325_LQK
Evaluation Kit for ATM3330	ATMEVK-3330-QN-6	ATMEVK_3330_QN
Evaluation Kit for ATM3330e	ATMEVK-3330e-QN-6, ATMEVK-3330e-QN-7	ATMEVK_3330e_QN, ATMEVK_3330e_QN_7
Evaluation Kit for ATM3325 WLCSP	ATMEVK-3325-CM-6	ATMEVK_3325_CM
Evaluation Kit for ATM3405	ATMEVK-3405-PQK-2	ATMEVK_3405_PQK_2
Evaluation Kit for ATM3425	ATMEVK-3425-PQK-2	ATMEVK_3405_PQK_2
Evaluation Kit for ATM3430e	ATMEVK-3430e-WQN-2	ATMEVK_3405_PQK_2

To build a reference example application, go to the respective directory and issue the 'make' command with BOARD=<board configuration>. For example:

cd platform/atm34/ATM34xx-2/examples/BLE_adv
make BOARD=ATMEVK_3430e_WQN_2 all

For further details, please refer to the **SDK User Guide.**

2.3 ATM33/e Features Added/Updated in SDK 6.0.0

The following lists the ATM33/e features added/updated in SDK 6.0.0:

- Security Enhancements - Anti rollback, Sticky locks, Image validation speedup, and OTA image encrypt/decrypt
- Programming time improvements
- NVDS Backup support to protect against loss due to power failure
- Newer Version of GCC, version 13.2, and tooling
- Native MacOS support (without the need for Rosetta) on Apple M1/M2/M3 systems
- Application Example - Secure peripheral example using crypto sha

2.4 ATM33/e and ATM34/e Complete Feature List

This section describes the complete list of features for the ATM33/e series and ATM34/e series supported by SDK release 6.0.0.

Category	Features Supported	ATM33/e Series	ATM34/e Series
AoA/AoD of Arrival (BT5.1)	AoA Tag/Transmitter and AoA Locator/Receiver	✔	not supported
Bluetooth LE Core Features	Bluetooth LE Power Control	✔	✔
	Peripheral and Broadcaster role	✔	✔

Category	Features Supported	ATM33/e Series	ATM34/e Series
	Central role (multiple master)	✔	✔
Bluetooth LE 5.2 Features	Enhanced Attribute Protocol (EATT)	✔	✔
PHY Rates	1 Mbps	✔	✔
	2 Mbps	✔	✔
	125 kbps / 500 kbps Coded PHY	✔	✔
Clocks	16 MHz	✔	not supported
	32 MHz	✔	✔
	48 MHz	✔	✔
	64 MHz	✔	✔
Internal RC	32 kHz Internal RC oscillator (RCOSC)	✔	✔
Audio Interfaces	PDM	✔	✔
Peripherals	I2C Master	✔	✔
	I2S Master	✔	✔
	UART (Debug, HCI)	✔	✔
	SPI Master (not for external flash)	✔	✔
	SPI Slave	✔	Future SDK Releases
	PWM	✔	✔
	IR Tx Support (PWM FIFO based)	✔	✔
	IR Rx (Learning) Support	✔	Future SDK Releases
	GADC	✔	✔
	QSPI external flash support - data storage, OTA staging	✔	✔

Category	Features Supported	ATM33/e Series	ATM34/e Series
Power Save Modes	Sleep	✔	✔
	Hibernate	✔	✔
	Retention	✔	✔
	SOC Off	✔	✔
	Powerdown	✔	✔
Audio Codecs and PTT/HTT Software support	ADPCM	✔	✔
	Google 1.0 Voice Support	✔	✔
	mSBC (APIs)	✔	✔
	Programmable Filters/Equalizer, Bi-quad support	✔	✔
Power Management Unit	3V Battery mode, No recharging	✔	✔
	VBAT_LI Full operating range 2.7V-4.2V; Auto control	✔	✔
Harvesting Recharge (applicable to ATM33e and ATM34e only)	Direct recharging from harvesting when VBATLI < 3.4 V	✔	✔
	Clock control for External Booster Circuit	✔	✔
	HSC operation/recharge using discrete booster	✔	✔
	Multiple energy harvesting discrete booster options, including inductive boosting and 2-diode boosting configurations	✔	✔
	Li-Ion Battery 4.2 V (operation+recharging) EVK default configuration is using VBAT. For Li-Ion (VBATLI) configuration, please refer to ATM33/e Series Evaluation Kit User Guide.	✔	✔
Energy Harvesting (applicable to ATM33e and ATM34e only)	Standalone Multi-cell PV support	✔	✔
	Standalone Single-cell PV support - 500 mV	✔	✔
	RF - 2.4 GHz	✔	Future SDK Releases
	RF - 915 MHz	✔	✔

Category	Features Supported	ATM33/e Series	ATM34/e Series
	Standalone PV and RF harvesting	✔	✔
	Concurrent harvesting without MPPT (multi-cell PV and RF)	✔	✔
	Overvoltage protection of Battery/HSC	✔	✔
	Undervoltage/brownout protection of Battery/HSC	✔	✔
	Harvesting power meter (MPPT-based), for “PMU+Booster” and “PMU, no boost” configurations	✔	✔
Boosting recharge from harvesting for VBAT_LI > 3.3V (applicable to ATM33e and ATM34e only)	PMU + 2-diode booster, boost from VSTORE, single cell PV (0.4 - 0.7V)	✔	✔
	PMU + 2-diode booster, boost from VSTORE, 4-Cell PV (2.2V)	✔	✔
	PMU bypass, inductive booster, boost from VHARV, single cell PV (0.4 - 0.7V)	✔	✔
	PMU bypass, inductive booster, boost from VHARV, 4-Cell PV (2.2V)	✔	✔
	PMU bypass, 2-diode booster, boost from VHARV, 4-Cell PV (2.2V)	✔	✔
	PMU bypass, 2-diode booster, boost from VHARV, 6-Cell PV (2.6V)	✔	✔
Direct recharge from harvesting, PMU, no boost for VBAT<= 3.3V (applicable to ATM33e and ATM34e only)	PV Harvesting, 4-cell PV (2.2V), Storage: Capacitor + 3V battery (3V battery extension), capacitor charged at VStore	✔	✔
	PV Harvesting - single-cell PV (0.4V-0.7V) Storage: Lithium rechargeable battery, ML-2032	✔	✔
	PV Harvesting - 4-cell cell PV (2.2V) Storage: Lithium rechargeable battery, ML-2032	✔	✔
	RF Harvesting - 900 MHz Storage: Lithium rechargeable battery, ML-2032	✔	✔
Security	AES-128/256 HW cryptographic engine	✔	✔
	SHA2-HMAC-256 HW cryptographic engine	✔	✔
	TRNG	✔	✔

Category	Features Supported	ATM33/e Series	ATM34/e Series
	Secure Boot (ECDSA signing/verification)	✔	✔
	ECDSA for signing (based on MCU boot)	✔	✔
	Secure Debug (driver to lock down debug ports)	✔	✔
	Secure Journal	✔	✔
	Secure Key Storage	✔	✔
	Secure Key Exchange/Management	✔	✔
	ARM TrustZone	✔	✔
	Root-of-Trust	✔	✔
	Secure firmware upgrade with Anti-rollback	✔	✔
Wakeup Receiver	scan_adv, integration with iBeacon and Bluetooth Inquiry	✔	Future SDK Releases
Sensor Hub	DataStore, DataTrigger	✔	
Quuppa RTLS	Quuppa Tag support	✔	not supported

3. SDK Configurations and Tools

The following lists the SDK Configurations and Tools supported for ATM2/3, ATM33/e, and ATM34/e Series for the SDK 6.0.0 release.

Category	Features Supported	ATM2/3 Series	ATM33/e Series	ATM34/e Series
ATM Wireless Stack Flavors	PD50 - Peripheral role. Basic BLE features. Optimized for size and functionality to create a monolithic image combining stack and application. See …./lib/ble_52PD50.README	N/A	✔	✔

Category	Features Supported	ATM2/3 Series	ATM33/e Series	ATM34/e Series
	PD100 - Peripheral role. Advanced features. Includes AoA/AoD, Periodic Adv/Sync, AHI Transport, and EATT support. See …./lib/atmwstk_PD100.README for more details	N/A	✔	N/A
	CPD200 - Central and Peripheral roles. Includes more concurrent connections, LE Power Control, GATT Client interface, central plus peripheral role. See…/lib/atmwstk_CPD200.README for more details (rev-2/lib/blell/blellCPD200.README for ATM34/e)	N/A	✔	✔
	Full Stack, all roles. (AoA/AoD only on ATM33/e)	✔	✔	✔
Programmed ATM Wireless Stack	Programmed (developer or factory), fixed image stack, non-upgradeable.	N/A	✔	N/A
ROM ATM WSTK	Wireless stack in ROM (Full stack)	✔	N/A	N/A
Image Partitioning and OTA Staging	Application partition	External Flash	RRAM	RRAM
	FW OTA image staging in External Flash	✔	✔	✔
	FW OTA image update to support Swap and Overwrite modes	Swap only (via flash partition re-map)	Both	Both
Development Platform	Platform - Linux	✔	✔	✔
	Platform - Windows 10/11	✔	✔	✔
	Platform - MacOS (x86, M1/M2/M3)	✔	✔	✔
Development	gcc compiler	✔	✔	✔

Category	Features Supported	ATM2/3 Series	ATM33/e Series	ATM34/e Series
Toolchain	IAR C/C++ compiler	✔	✔	✔
IDEs	IAR Workbench	✔	✔	✔
	Segger Embedded Studio	✔	✔	✔
	Keil IDE	✔	✔	✔
Debug Tools	J-Link Debugger (On Board)	✔	✔	✔
	OpenOCD debug	✔	✔	✔
Other Tools	Pinmux Tool	✔	✔	✔
	RFTool	✔	✔	✔
	MPTool	✔	✔	Future Software Release

4. SDK Platform Working Directory

Following is a list of Atmosic SDK platform working directories:

- For ATM2/3 devices, use the directory:
  - platform/atm2/ATM22xx-x1x OR
  - platform/atm3/ATM32xx-x1x
- For ATM33/e devices, use the directory:
  - platform/atm33/ATM33xx-5
- For ATM34/e devices, use the directory:
  - platform/atm34/ATM34xx-2

4.1 Reference Applications and Examples

The reference examples and applications supported with this release are provided in the following directories respectively

platform/atm2/ATM22xx-x1x/examples

platform/atm3/ATM32xx-x1x/examples

platform/atm33/ATM33xx-5/examples

platform/atm34/ATM34xx-2/examples

5. Limitations and Known Issues

5.1 ATM34/e

Issue	Using the HID_keyboard example application, and stress testing the system with repeated 1000s of keystrokes, occasionally after a long time, the system may become slow and less responsive
Impact	The system will be less responsive and may run out of system resources like buffers or timers.
Resolution	Restart the Device To be fixed in the next SDK release

Issue	A build command ‘make run’ with DEBUG disabled, may get an error message on the screen atm_fast_load.tcl:408: Error: <fast_load> error code: 0x12
Impact	make command will not succeed and result in an Error
Resolution	This is because of a missing partition_info.map file. Try doing a ‘make clean’ followed by ‘make run_all’ instead OR you can try disabling FAST_LOAD by ‘make FAST_LOAD= run” instead

Issue	Using the HCI_vendor example with a compile build flag FORCE_TX_PWR does not work
Impact	FORCE_TX_PWR does not take effect to adjust the TX Power
Resolution	To be fixed in the next SDK release

Issue	The Energy Harvesting meter is not reporting correct metering results
Impact	The meter is reporting roughly 2.6 times the measured harvested energy
Resolution	To be fixed in the next SDK release.

6. Resolved Issues

6.1 ATM34/e

Issue	In environments with a lot of RF interference, a boot-time calibration may occasionally fail resulting in an assert failure ASSERT ERR(0) at hw_cfg.c:604
Resolution	Moving the ATM34 to an environment with less RF interference or adding an attenuator at the ATM34 RFIO connector mitigates this issue. Also, we have enhanced the firmware to do LNA-TIA interpolation instead of an Assert failure

Issue	Today we use UART0 for HCI and UART1 for Debug. Some users would like the option of reversing
Resolution	Added a compile flag option HCI_CMD_PORT which can be set to UART1 to alter the default operation

Issue	ATM34 running BLE_att_client makes a connection only to one server when more than one server is present
Resolution	The software has been enhanced to connect up to two servers.

Revision History

Date	Version	Description
July 29, 2024	1.30	Adding ATM33/e Features Added/Updated in SDK 6.0.0, Update Complete Feature List, SDK Configurations and Tools, Limitations and Known Issues, Resolved Issues
May 22, 2024	1.20	Updates to limitations and known issues.
March 28, 2024	1.10	Updates to limitations and known issues.
January 26, 2024	1.00	Initial version created.

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