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XBee 3 Zigbee Release Notes

XBee 3 Zigbee

Version 1010 - August 12, 2022

INTRODUCTION

These release notes document changes made to the Zigbee firmware on the XBee 3 RF modules

- Product Information
- Documentation
- Support

SUPPORTED PRODUCTS

- XB3-24 - XBee 3 2.4 GHz radio module
  - Micro (MMT)
  - Surface Mount (SMT)
  - Through Hole (THT)

KNOWN ISSUES

1. Issuing a self-addressed remote AT command (0x17 frametype) will output a duplicate 0x97 command response frame that always indicates a 0x04 Tx Failure status. *[XBHAWKZB-1525]*

2. When the UART is disabled (**P3** and **P4** are not set to 1), CTS will still indicate that the UART is clear to send. *[XBHAWKZB-423]*

3. The first wake period when using cyclic sleep with pin wake will be 500ms longer than subsequent wake periods. *[XBHAWKZB-1043]*

4. While performing intensive file system operations, there is a chance that incoming RF data will be lost. *[XBHAWK-473]*

5. A transmit status of 0x26 (relay of broadcast not heard) may be emitted if many broadcast transmissions are sent with a the Broadcast Radius set to a value much larger than the actual number of hops on the network. This status can be safely disregarded as the broadcast is still transmitted as expected and does not need to be resent. *[XBHAWKZB-1272]*

BLE:

6. BLE cannot be authenticated while the XBee is in command mode. The local radio must not be in command mode in order to respond to unlock BLE API frames. *[XBHAWK-311]*

7. If the XBee's serial UART buffer is full (CTS has deasserted), the BLE interface will be unresponsive. *[XBHAWKZB-1296]*

OTA(over-the-air) Firmware Updates:

8. Performing a self-addressed OTA firmware update may be unreliable. Retries are needed even though no RF traffic involved. It's recommended to perform local firmware updates using the serial interface (via invoking the bootloader). *[XBHAWKZB-763] [XBHAWK-337]*

9. When performing a self-addressed OTA firmware update, TxStatus messages are not emitted. *[XBHAWKZB-779]*

MicroPython:

10. Issuing ADC.read() in a loop on MicroPython without a delay in between reads, can cause the running script to terminate and reset the MicroPython REPL. *[XBHAWKZB-1837]*

UPDATE CONSIDERATIONS

XCTU (XBee Configuration and Test Utility) is recommended for updating the firmware of your radio module to the latest firmware version: www.digi.com/xctu

Enabling the High RAM concentrator mode on the target node during an OTA firmware update has proven to show an improvement in the duration of the upgrade. This can be performed by setting **DO** to **0x40** and **AR** to **0x00** on the target node after the network is formed to transmit a Many-to-one route request and then initiate the upgrade. Once the update is successfully completed, set **AR** to the default value of **0xFF** to disable the high RAM concentrator mode on the target node and return to normal operation.

Downgrading a module from 1008 to 1007 will lock up the module if any AT commands specific to 1008 are set to non-default values. To avoid this: clear any 1008 specific AT commands (**LX, LY, LZ, *S,* V, *W,* X, *Y**) to default values and then downgrade to 1007. If a module running 1007 does get locked up, use the XCTU recovery tool to upgrade to 1008, clear the 1008 AT commands to default values and then downgrade to 1007.

OTA firmware updates use the same storage space as the file system and MicroPython code. Initiating an OTA firmware update will erase the file system of the target device. After performing an OTA firmware update, you can subsequently perform an OTA file system update to push a MicroPython application.

The file system will need to be formatted after a firmware update before it can be utilized. If a serial firmware update was performed, the file system and bundled code on the device is retained but can only be accessed by the version of firmware that was active at the time it was formatted.

Example: If the file system was formatted for version 1007, it would not be accessible after a serial firmware update to 1008. To make use of the file system, it should be formatted for version 1008. If instead the file system is left untouched and the firmware is serially downgraded back to 1007, the file system from before the firmware update would be accessible.

OTA bootloader update support was added in version 1005. **You must perform a serial update to firmware version 1005 or later and bootloader version 166 or later to be able to perform subsequent OTA firmware and bootloader updates.**

A firmware update from 1003 to any later release results in loss of configuration. As a result, the updated software will operate with default settings. **After the update from 1003, configuration will need to be set via the serial port.**

Update from	Update to	Update Method	Configuration Retained?
1001 - 1003	Any	Serial only	No
1005	Any newer	Serial or OTA	**Yes**

The following files are included in XBee 3 RF firmware releases:

- Firmware
    - GBL: Firmware image for gateways and OEM serial updates
    - OTA: Firmware image for OTA firmware updates
    - OTB: Firmware + bootloader image for OTA updates
    - EHX: Encrypted firmware for Legacy X-CTU
    - EHX2: Encrypted firmware for XCTU-NG
- Configuration
    - MXI: Legacy X-CTU configuration file
    - XML: XCTU-NG configuration file

UPDATE BEST PRACTICES

Digi recommends the following best practices:

1. Test the new release in a controlled environment with your application before you update production devices.
2. Unless otherwise noted, apply updates in the following order:
    1. Device firmware
    2. Modem firmware
    3. Configuration
    4. Application

Digi recommends Digi Remote Manager for automated device updates. For more information, go to https://www.digi.com/products/iot-platform/digi-remote-manager.
If you prefer manually updating one device at a time, follow these steps:

Serial firmware updates:
Invoke the bootloader using one of two methods:

- Issue the **%P** AT Command
- Using hardware flow control lines

Interface with the bootloader at 115200 baud and transfer a bootloader or firmware image as per the user guide.

An [XBee MultiProgrammer](#) is available for serial firmware updates in a production environment.

OTA firmware/file system updates:
Refer to the [user guide](#) for information on performing an OTA firmware and file system update.
The OTA firmware update process for XBee 3 is the same across all supported RF firmwares and utilizes ZCL frames. To perform an OTA bootloader update, use the supplied *.OTB file, which is a combined firmware + bootloader image. The *.OTA file is just the firmware.

The [XBee Network Assistant](#) can be used to manage your network and optimize it's configuration prior to performing an OTA update.

TECHNICAL SUPPORT

Get the help you need via our Technical Support team and online resources. Digi offers multiple support levels and professional services to meet your needs. All Digi customers have access to product documentation. firmware, drivers, knowledge base and peer-to-peer support forums.

Visit us at https://www.digi.com/support to find out more.

CHANGE LOG

1010 - Digi XBee 3 Zigbee (August 12, 2022)

- This is a recommended release
- Zigbee Stack: EmberZNet 6.7.6.0 Zigbee 3.0 stack
- [Bootloader version: 1.11.2](#)
- SMT/MMT Hardware revision T
- MMT Reel Hardware revision: E
- TH Hardware revision O

NEW FEATURES

1. Implemented a new option (**DC** bit 6) for remote devices to send an updated route record to the concentrator when the **AR** interval occurs. The route record responses are staggered over the remote node discovery time period (**NT**).

ENHANCEMENTS

1. Added provisions to correct a broken source route by sending a directed broadcast (an IEEE broadcast containing the address of the only node that will respond) to the node with a broken source route so that that node can send a unicast back with the corrected source route.

2. Added logic to reject source routes on the coordinator when the nodeID is zero as source route addressing information is being added to the RF transmission address lookup table. *[XBHAWKZB-1828]*

3. Added collision avoidance by preventing a Many-To-One route request from being sent while waiting for node discovery responses.

SECURITY FIXES

- N/A

BUG FIXES

1. Fixed lockup issue due to switching between RF protocols (Zigbee, DigiMesh, and 802.15.4) the tokens from a previous protocol were not being fully erased. *[XBHAWKZB-1733]*

100D - Digi XBee 3 Zigbee (June 4, 2021)

- This is a recommended release
- Bootloader version: 1.11.2
- Hardware revision M

ENHANCEMENTS

1. Changes to support a new hardware revision of the Xbee3 module. The hardware revision can be determined by querying the %C AT command. Modules with a %C value of 2 or greater cannot run firmware versions prior to this release.

100B - Digi XBee 3 Zigbee (September 11, 2020)

- This is a recommended release
- Zigbee Stack: EmberZNet 6.7.6.0 Zigbee 3.0 stack
- Bootloader version: 1.8.1
- SMT/MMT Hardware revision S
- MMT Reel Hardware revision: D
- TH Hardware revision N

NEW FEATURES

1. The `modem_status.receive()` and `modem_status.callback()` functions have been added to the `xbee` module in MicroPython, allowing MicroPython applications to respond to modem status messages generated by the module.

2. The `receive_callback()` function has been added to the `xbee` module in MicroPython, allowing MicroPython applications to register a callback to handle incoming RF packets.

3. The `xbee_connect()` function has been added to the `ble` module in MicroPython, which allows XBees to connect via Bluetooth to other XBees.

4. The `ucryptolib` MicroPython module has been added allowing for hardware accelerated AES encryption/decryption in user applications.

ENHANCEMENTS

1. The `sleep_now()` function when using the pin wake option will now sleep regardless of the current state of the SLEEP_RQ line. The function can also be used to go to sleep without setting a timeout which consumes slightly less power than sleeping with a timeout. If using pin wake, the SLEEP_RQ line will only wake the radio on a falling edge. This allows the module to sleep when a one-shot pulse is used for wakeup. *[XBHAWK-527], [XBHAWK-518]*

2. The `idle_radio()` and `poll_now()` functions have been added to MicroPython, allowing end devices to put the radio in an idle state when it is not needed in order to further reduce power usage.

3. The Over-Voltage detection has changed to allow the module to continue to operate but will limit the RF power level **PL** setting to a value of 3 when the operating voltage reaches 3.7 volts or higher. If the module is in API mode, it will emit Over-Voltage modem status frames periodically as long as the operating voltage remains above 3.7 volts. *[XBHAWKZB-1656]*

SECURITY FIXES

- N/A

BUG FIXES

1. Fixed issue when **P5** - **P9** are set as digital outputs were being pulled up instead of driven high or low during sleep.*[XBHAWK-524]*

2. Fixed an issue where Micropython would lockup when calling machine.rng() after waking from sleep.*[XBHAWKZB-1652]*

3. Fixed an issue where the Associate LED would stop blinking after several days of operation. *[XBHAWKZB-1661]*

4. Fixed an issue with retaining **ZS** when upgrading to firmware version 100A. An upgrade to version 100B will now retain **ZS**. However, because released firmware cannot be changed, ZS may not be retained when downgrading to any firmware version prior to 100A. *[XBHAWKZB-1696]* Workaround for both upgrades and downgrades is to set ZS to 0 network-wide and then set ZS to the desired non-default value on all nodes in the network after the firmware is updated.

5. Fixed a problem with losing access to the serial port by changing the configuration of P7 from 1 to 4. This action had the effect of driving SSEL low, causing an interrupt which switched operation from the UART port to the serial port. *[XBHAWKZB-1702]* Workaround when using older versions of this code is to set P5, P6, or P8 to a value other than 1, apply the changes (ATAC), and then set P7 to 4. By using this sequence, the SPI is already disabled before P7 is set to 4 so that the interrupt to switch to the SPI port cannot happen.

6. Fixed sleep issue where microPython sleep_now() and cyclic sleep **SM** options 4 and 5 was limited to 65,535 milliseconds. *[XBHAWKZB-1701]*

7. Fixed a MicroPython network discovery (**ND**) issue where discovery responses were not being passed to the customer MicroPython script unless operating with **AP** set to 4. *[XBHAWK-592]*

8. Fixed a minor issue where status data of verbose join extended modem statuses in API mode were being emitted in little endian format instead of big endian. *[XBHAWKZB-1640]*

9. Fixed a zero addressing issue where the 64-bit source and destination address was not being sent in RF unicast packets to know which module sent the packet in a large network. *[XBHAWKZB-1699]*

100A - Digi XBee 3 Zigbee (April, 30 2020)

- This is a recommended release
- Zigbee Stack: EmberZNet 6.7.1.0 Zigbee 3.0 stack
- Bootloader version: 1.8.1
- SMT/MMT Hardware revision R
- MMT Reel Hardware revision: C
- TH Hardware revision M

NEW FEATURES

1. Trust Center Backup and Restore Using the **BK**, **KB**, and **CX** commands it is now possible to create a backup file of a centralized trust center's configuration and network security parameters that can be retrieved from the file system. This file can then be used to restore the trust center using a new XBee in the event of a hardware failure of the original device without requiring the network to be reformed.

2. XBee 3 Zigbee now supports automatic network key rotation. The **RK** command has been added to define the interval (in days) that the centralized trust center should generate a new random network key for the network. The maximum interval that can be set is 22 days; however setting **RK** to 0 will perform a one-time key rotation, which can be used to extend the interval via a host controller.

   - A new 0x45 modem status (0x8A frametype) indicates when the network key rotation has been initiated. A 0x07 modem status will be emitted by all devices on the network after they have switched to using the new key.

3. An OTA server can now be specified with the **US** command. If **US** is non-zero, OTA updates will only be accepted from a server whose 64-bit address matches the value of **US**.

4. Bluetooth Low Energy (BLE) `digi.ble` module now supports:

   - GAP connect.
   - GATT client operations.
   - See the MicroPython Programming Guide for additional details.
   - See the Digi XBee PyCharm IDE plugin and XBee Mobile SDK for examples.

5. The **BP** command has been added to allow adjustment of the BLE advertisement power level using options **0** - **3**:

   - 0 = -20 dBm
   - 1 = -10 dBm
   - 2 = 0 dBm
   - 3 = 8 dBm

6. The `WDT` class has been added to the `machine` MicroPython module. This allows for the system to detect a hung or poorly behaved application in certain scenarios and recover. The Digi implementation differs from upstream in that it has modified defaults and allows a selection of recovery strategies.

   - See the MicroPython Programming Guide for additional details.
   - An example of use can be found on our github repo

ENHANCEMENTS

1. The Association LED now identifies when the join window is open. If the device has an open join window, the association LED will blink rapidly (100ms).

   - If **NJ** > **0xA**, there is a 10 second hold off after a device resets, forms, or joins a network before the rapid LED flash occurs. This allows a user to identify the device role through the normal blink pattern before seeing that the join window is open.
   - New 0x8A modem statuses have been added to identify the state of the join window:
     - 0x43: Join window has opened
     - 0x44: Join window has closed

2. Multiple changes have been made to the over-the-air firmware update process to bring it into alignment with the ZCL specification that it is based on. Refer to the user guide section on OTA updates for more information.

3. A firmware or filesystem OTA update can now be scheduled for a certain time or delay. When performing an OTA firmware update, the radio will schedule the update to occur based on the `currentTime` and `upgradeTime` fields in the upgrade end response. *[XBHAWKZB-782]*

4. Additional verbose join messages have been added to facilitate debugging of association issues.

5. The **AO** command have been expanded to support more options. For detailed information, refer to the [Receiving ZDO command and responses](#). in the user guide. **AO** now supports the following options:

    - Bit 0 - Output in Native/Explicit API format
    - Bit 1 - Supported ZDO request pass-through
    - Bit 2 - Unsupported ZDO request pass-through
    - Bit 3 - Binding request pass-through
    - Bit 4 (new) - Echo received supported ZDO requests out the serial port
    - Bit 5 (new) - Suppress all ZDO messages from being sent out the serial port and disable pass-through

6. While operating in transparent mode (**AP** = **0**), the **NP** command will now take into account the configuration of **EE**, **TO**, **DH**, and **DL** when returning the maximum number of bytes that can be sent in a single non-fragmented packet.

7. Increased RAM available to the MicroPython interpreter to allow for more complex applications.

8. If a password is included in a secure session logout frame, the password will be ignored and the logout completed instead of generating an error.

9. Some configuration options within XCTU have been rearranged and new sections added to improve usability.

    - **R?** command has been added to XCTU configuration, this command identifies the power variant (PRO or Non-PRO) of the device.
    - **VL** command has been added to XCTU configuration, this command provides some details about the hardware and software.

10. The XBee ANSI C library has been refreshed and fully supports the XBee 3: https://github.com/digidotcom/xbee_ansic_library

SECURITY FIXES

1. Fixed issue where the Secure Session authentication is not randomized if BLE is not enabled. *[XBHAWK-416]*
    - See [security notice knowledge base article](#) for additional information.

BUG FIXES

1. Resolved an issue where the transient link key used by the network would expire and prevent devices from associating. *[XBHAWKZB-1453]*

2. The link key stored in the **KY** parameter will be persistently active in the key table. Previous releases would cause this key to expire after **KT** seconds. This allows devices using a global link key to more easily join the network. *[XBHAWKZB-1627]*

3. Resolved an issue where sleeping end devices that are associated with an encrypted network and had an **NR** command issued would prefer to rejoin the previous network rather than seek a new one. *[XBHAWKZB-1624]*

    - It is recommended that when in the presence of mixed encrypted and non-encrypted networks with **ID** = **0**, **JV** should be set in order to validate the IEEE network address request from the coordinator.

4. Install code CRCs were using the wrong endianness. *[XBHAWKZB-1638]*

- Install code format: <16-byte installation code> + <2 byte CRC>
- The install code read by the **I?** command now outputs the CRC in little-endian byte order (the installation code itself remains big-endian). In previous releases (1009 and earlier), the calculated CRC would be in big-endian byte order.
- Registering a device using the 0x24 API frame will now accept install codes whose CRC is in in either endianness.

5. Resolved an issue that was preventing ZDO bind requests from being handled properly by the XBee. *[XBHAWKZB-1636]*

6. Corrected the receive options for incoming ZDO commands and responses in 0x91 API frames. In versions 1008 and 1009, they were being misidentified as secured packets (0x10). *[XBHAWKZB-1637]*

7. Resolved an issue that prevented the **NT** command parameter from affecting network discovery (**ND/DN**) timeout. *[XBHAWKZB-247]*

8. Resolved RSSI issue where the PWM signal was close to 100% duty cycle for most of the RSSI signal strength range. *[XBHAWK-400]*

9. Resolved an issue that caused duplicate 'associated' and 'disassociated' modem status messages to be emitted when network watchdog **NJ** and join verification **JV** were both enabled. *[XBHAWKZB-1571]*

10. Some read-only AT commands would accept a parameter value but ignore it. These commands now return ERROR if a parameter is attempted to be set: **PP**, **OI**, **OP**, **NC**, **NP**, **VL**. *[XBHAWKZB-984]*

11. Resolved an issue when operating in transparent mode (**AP** = **0**), unencrypted broadcast packets were limited to 84 bytes whereas the max packet size should have been 92 bytes. *[XBHAWKZB-1585]*

12. During a successful OTA update, a transmission status (0x89) message with an error no longer occurs on a query next image response or an upgrade end response. Instead, both transmissions from the server will receive a successful transmission status. *[XBHAWK-380]*

13. Resolved an issue where a low **GT** value could cause a device to lock up. *[XBHAWKZB-1622]*

MicroPython:

14. When MicroPython is enabled **AP** = **4**, explicit ZDO/ZCL messages are now passed to MicroPython for application processing depending on the **AO** setting. *[XBHAWKZB-1524]*

15. Resolved an issue that would cause a conflict if MicroPython read an I/O line at the same time as the XBee application (e.g. **IR** is set and an `ADC.read()` occurs). *[XBHAWKZB-1587]*

16. ATPY^ now correctly interrupts a MicroPython script which has disabled keyboard interrupts using `micropython.kbd_intr(-1)`. *[XBPY-446]*

17. The MicroPython REPL no longer continuously prints "soft reboot" if autostart is disabled after the script starts and the script performs a soft reset. *[XBPY-795]*

18. Calling `os.remove()` will properly trim the file system and reclaim space. *[XBHAWK-407]*

1009 - Digi XBee 3 Zigbee (November 22, 2019)

- This is a recommended release
- Zigbee Stack: EmberZNet 6.5.0.0 Zigbee 3.0 stack
- Bootloader version: 1.8.1
- SMT/MMT Hardware revision P

- MMT Reel Hardware revision: B
- TH Hardware revision L

NEW FEATURES

1. Bluetooth Low Energy (BLE) GAP scan and advertisements in MicroPython
   - The `digi.ble` module is now available in MicroPython.
   - GAP scan (advertisement discovery) and custom advertisement is supported.
   - See the [MicroPython Programming Guide](#) for additional details.
   - See the [Digi XBee PyCharm IDE plugin](#) and [XBee Mobile SDK](#) for examples.
2. The **BI** command has been added, which determines the name that appears in the BLE advertisement data. If **BI** is set to the default value (0x20; ASCII space character), the default "XBee3 Zigbee" name will be used. *[XBHAWKZB-1534]*

ENHANCEMENTS

1. Querying **KY** and **NK** behavior has changed *[XBHAWKZB-1496]*

   - When queried, **KY** and **NK** will return zero if the value of the key is zero; otherwise, for all other values it will give an OK response to indicate a key is present

2. Added the **C8** command for enabling compatibility options when operating in networks containing XBee3 and older generation XBee Zigbee modules. Bit 4 (**C8** | 0x10) configures LQI calculations for Legacy XBee Zigbee compatibility. Operating a mixed network without this bit set will prioritize legacy devices when determining route cost. *[XBHAWKZB-1523]*

3. When performing and OTA update, the client can now accept an image block of any size equal to or less than the value specified in the maximum image size field of the image block request. Previously the sizes the client could accept were hard coded constants. *[XBHAWKZB-1506]*

4. When using the network conflict locator (**NW** and **DC**), the module will search on the original network channel when scanning for a new network.

   - Refer to the [User Guide](#) for more information on the Network Watchdog and Network Locator features.

SECURITY FIXES

1. Resolved an issue where a router or end-device switching from an encrypted network to a non-encrypted network would result in loss of RF communication *[XBHAWKZB-1453]*

BUG FIXES

1. Removed redundant ZCL default responses that were getting generated erroneously whenever an Image Block Request was sent to an OTA server module *[XBHAWKZB-1432]*

2. Fixed an issue where an OTA update to a client that is simultaneously transmitting data to the server (that is sending the firmware image to the client) would abort due to loss of data in the client to server direction. Also added retry logic for instances of RF data loss for greater reliablity of the update *[XBHAWKZB-1477]*

3. Fixed an issue where after a reset/power-up event, the output power level would revert to the level set at when the module first formed/joined the network *[XBHAWKZB-1457]*

4. Fixed an issue when using sleep pin wake (**SM** 1 or 5) where toggling RTS would wake the module *(XBHAWKZB-1392)*

1008 - Digi XBee 3 Zigbee (September 30, 2019)

- This is a recommended release
- Zigbee Stack: EmberZNet 6.5.0.0 Zigbee 3.0 stack
- Bootloader version: 1.8.1
- SMT/MMT Hardware revision N
- MMT Reel Hardware revision: A
- TH Hardware revision K

NEW FEATURES

1. Secure Session
   This expansion to the Digi Trustfence allows you to establish a Secure Session between two XBee modules using SRP authentication. Data payloads sent across a secure session can be encrypted, providing trusted end-to-end encryption of secure data, even on an unencrypted network. *[XBHAWKZB-1364]*
   - To protect against unauthorized remote configuration, set a Secure Session password and enable bit 1 of the **SA** command. Once configured this way, remote configuration can only be performed when a secure session is established and command option bit 4 is set in the 0x17 Remote AT Command options field. *[XBHAWKZB-1365]*
   - To protect serial RF data output, configure a Secure Session password and enable bit 2 of the **SA** command. Once configured this way, serial RF data will only be emitted when a secure session is established and the Transmit Options bit 4 is set in an outgoing 0x10 or 0x11 frame. *[XBHAWKZB-1372]*
2. Added location parameters to configuration. These are intended for use with Digi Remote Manager and Network Assistant to track a device's location based on GPS coordinates saved to flash. These location fields are user-defined and accept up to 15 ASCII characters:
   - **LX** = Location X - Longitude
   - **LY** = Location Y - Latitude
   - **LZ** = Location Z - Elevation
3. Added **DM** command which can be used to disable features such as OTA firmware updates and SRP authentication for secure session. *[XBHAWKZB-1332]*

ENHANCEMENTS

1. Enhanced the Network Watchdog to optionally allow routers and end devices to follow the coordinator if a PAN ID change occurs. *[XBHAWKZB-1410]*

   - This behavior can be enabled by setting Device Option bit 5 (**DC** | 0x20)
   - The Network Watchdog (**NW**) must be set to a non-zero value to activate this behavior

2. New modem statuses have been added to identify when a PAN ID conflict has occurred. *[XBHAWKZB-1343]*

   - 0x3E: Emitted by a coordinator indicating that a PAN ID conflict was detected but no action will be taken because **CR = 0**
   - 0x3F: Emitted by a coordinator that has updated its PAN ID due to a conflict and **CR** is non-zero
   - 0x40: Emitted by a router that received a new PAN ID from the coordinator due to a conflict

3. XBee 3 Zigbee networks operating with a distributed trust center now support transmitting packets to the coordinator using the reserved 0x0000 address. *[XBHAWKZB-1301]*

   - A distributed trust center is specified by clearing Encryption Option bit 1 (**EO** &= ~0x02) before forming a network.

4. **FS INFO** has been enhanced with a new command parameter: **FS INFO FULL**

- This provides information about the placement order of files in the file system.
- This will also indicate if there are any deleted files or unused directory slots.

5. Removing a file from the File System will reclaim space if the removed file was located at the end of the file system. This will also cause space taken by adjacent deleted files to be reclaimed as well.

6. Improved reliability of detecting very short pulses on DTR when configured for pin sleep. *[XBHAWK-247]*

BUG FIXES

1. Entering a duplicate entry in custom defaults will now override the previous entry. You no longer need to clear custom defaults before making changes. *[XBHAWKZB-1177]*

2. Resolved an issue where an interrupt-driven event that occurs while entering sleep could cause unexpected behavior. *[XBHAWKZB-1393]*

3. Resolved an issue that would cause a pin configured for ADC input to not take full effect until after a power cycle, which may have caused some inaccuracies in ADC measurements. *[XBHAWK-242]*

4. Resolved an issue that would cause a module to remain at 9600 baud indefinitely after entering command mode via serial break. *[XBHAWKZB-1424]*

5. Resolved an issue that caused transmission failures when using source routing with fragmentation of packets which affected over-the-air firmware updates. *[XBHAWKZB-1467]*

1007 - Digi XBee 3 Zigbee (July 12, 2019)

- Zigbee Stack: EmberZNet 6.5.0.0 Zigbee 3.0 stack
- Bootloader version: 1.8.1
- SMT/MMT Hardware revision M
- TH Hardware revision J

NEW FEATURES

1. Transmissions with explicit addressing (like API frame type 0x11) can now be sent using `xbee.transmit()` in MicroPython. Refer to the MicroPython Programming Guide for usage.

ENHANCEMENTS

1. The `ticks_us()` function has been added to MicroPython, allowing microsecond-resolution timing.

2. MicroPython has been updated and is now based off of the 1.11 release of the MicroPython project.

BUG FIXES

1. Resolved an issue where restoring non-default configuration after a reset caused devices to leave the network unexpectedly. *[XBHAWK-175]*

2. Resolved an issue where received packets sent to a non-default endpoint, cluster, or profile ID the receiving node would not be output in MicroPython. *[XBHAWKZB-1205]*

3. Resolved an issue on thru-hole module where no modem status was being sent in SPI mode after RESET. *[XBHAWKZB-1310]*

4. Resolved an issue where enabling sleep and applying the change with **AC** would cause CTS to deassert

while command mode was still active. *[XBHAWKZB-1305]*

5. Resolved RS-485 issue where option **D7**=6 or 7 would not take effect until after reset or power cycle. *[XBHAWKZB-1423]*

6. Resolved an issue where calling xbee.sleep_now(pin_wake=True) in MicroPython would make the pin_wake parameter permanently True. *[XBHAWKZB-1307]*

7. Resolved an issue that would cause a pin configured for ADC input to not take full effect until after a power cycle, which may have caused some inaccuracies in ADC measurements. *[XBHAWK-242]*

1006 - Digi XBee 3 Zigbee (April 10, 2019)

- Zigbee Stack: EmberZNet 6.5.0.0 Zigbee 3.0 stack
- Bootloader version: 1.8.1
- SMT/MMT Hardware revision L
- TH Hardware revision H

NEW FEATURES

1. MicroPython
    - Digital I/O
    - ADC input
    - PWM output
    - I2C serial interface
    - MicroPython sleep support (**SM** option 6 has been added to support this)
2. File System support
    - Includes support for OTA File System updates. This utilizes the same method as OTA firmware updates.
    - Local file system access via the **FS** AT Command.
    - XCTU can be used to easily navigate the file system of local and remote modules.

ENHANCEMENTS

1. The **PP** command now returns the output power based on current configuration.

2. Added **ET** command which sets the child table timeout value of a sleepy end device.

SECURITY FIXES

1. Bootloader - Improved ECDSA signature check which provides protection against fraudulent firmware update images. *[XB3BOOT-52]*
    - Note: The bootloader cannot be downgraded

BUG FIXES

1. Resolved an issue where Micropython would truncate strings longer than 1055 characters when printing. *[XBHAWKZB-1266]*

2. Improved the reliability of devices joining a new network if they were previously associated. *[XBHAWKZB-998]*

3. A device that attempts to join a secured network without a pre-configured link key will now return the correct **AI** status. *[XBHAWKZB-1087]*

4. Improved stability of the UART interface which reduces data loss in certain high data rate scenarios.

5. Sleepy End Devices are now responsible for updating the child table timeout of the parent node. A new AT command (**ET**) has been added to select the child timeout value that will be used upon association. *[XBHAWKZB-985]*

6. Out-of-band commissioning via 0x24 device registration frame populates the link key table properly. The **NJ** join window will also be opened when this frame is issued. *[XBHAWKZB-1149]*

7. Resolved an issue where an 0x97 response to an invalid **ND** request would have the wrong command in the AT Command field. *[XBHAWKZB-1183]*

8. Resolved an issue where the device could watchdog reset when joining a different network than the one it was previously associated with. *[XBHAWKZB-1213]*

9. Resolved an issue where a router that powered up more than 15 seconds before the coordinator would result in the router leaving the network and attempting a fresh join. *[XBHAWKZB-1273]*

10. Making a change to the **KY** parameter will be recognized as a security update and the device will initiate a join attempt. *[XBHAWKZB-1232]*

11. Resolved an issue where cyclic sleep with pin wake was not properly observing the nDTR/Sleep_rq line. *[XBHAWKZB-1159]*

12. Resolved an issue where pin wake was not properly observing the Slave Select (SSEL) pin. *[XBHAWKZB-1235]*

13. After a child poll timeout, an end device will now behave the same as an S2C when deciding whether to leave the network or attempt a rejoin. *[XBHAWKZB-221]*

14. If both the UART and SPI interfaces are disabled, the UART will still be accessible. *[XBHAWKZB-1186]*

15. Resolved an issue where an unassociated device was unable to perform an active scan using the **AS** command. *[XBHAWKZB-1055]*

16. Resolved an issue where entering command mode a second time while command mode was in the process of timing out would result in the device not returning an 'OK' response to the request. *[XBHAWKZB-1037]*

MicroPython:

17. Resolved issue where `xbee.transmit()` function would not return an error if a too-large payload was attempted. *[XBHAWKZB-1174]*

18. Corrected the data type that is returned when **SH** and **SL** commands are queried in MicroPython. These parameters now return as bytes rather than integers. *[XBHAWKZB-]*

19. HAWK-119 - The ON_SLEEP pin was not accurately showing when the module was ready to receive data after waking from sleep. *[XBHAWKZB-748]*

20. Resolved xbee.transmit() not generating an error message for sending to a non-existent device address. *[XBHAWKZB-1218]*

21. Resolved end devices not leaving the network after reset if **JV** is set to **1** and there is no coordinator present. The end device now sends an orphan notification and leaves the network. *[XBHAWKZB-1278]*

1003 - Digi XBee 3 Zigbee (March 16, 2018)

- Zigbee Stack: EmberZNet 5.10.0.0 Zigbee 3.0 stack
- Bootloader version: 1.1.8
- SMT/MMT Hardware revisions D-G
- TH Hardware revisions A-D

NEW FEATURES

1. Support for the Through-hole variant of the XBee 3

2. Initial MicroPython support

BUG FIXES

1. The **PR** and **PD** masks have been updated to enable a pull-up on all input and disabled pins.

2. Resolved an issue where a malformed 0x21 Create Source Route API frame could cause the device to watchdog.

3. Resolved an issue that prevented parameters from being written to flash if device had previously been running 802.15.4 firmware.

Bootloader:

4. Fix for a brownout issue *[XB3BOOT-3]*

1001 - Digi XBee 3 Zigbee (November 17, 2017)

- Zigbee Stack: EmberZNet 5.10.0.0 Zigbee 3.0 stack
- Bootloader version: 1.1.7
- SMT/MMT Hardware revisions A-C

NEW FEATURES

- Initial Release

ENHANCEMENTS

- Refer to the XBee 3 Zigbee migration guide for more information on the enhancements made to the Zigbee firmware on XBee 3 compared to the Zigbee firmware on the S2 and S2C XBee modules.

Release Notes Part Number: 93001300