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Digi XBee 3 Cellular LTE Cat 1 AT&T Release Notes

Digi XBee 3 Cellular LTE Cat 1 AT&T

Version 3101A (September, 2022)

INTRODUCTION

These are the release notes for Digi XBee 3 Cellular LTE Cat 1 AT&T.

SUPPORTED PRODUCTS

- [Digi XBee 3 Cellular LTE Cat 1 AT&T](#)

KNOWN ISSUES

1. By-pass mode is now deprecated and is not recommended for new designs. XBee 3 Cellular products support direct USB to access the cellular modem directly. See the user manual for details on how to configure your XBee to use direct USB.
2. CRITICAL!!: For complete support for new features added in the 31010 firmware such as Bluetooth Low Energy and the Gecko Bootloader, you must update to the latest version of XCTU (6.4.2 or later). If you are upgrading from a version prior to 31010, you must use the 3100F firmware. It will not be possible to downgrade to a version prior to 31010 after upgrading.
3. Module with SPI mode enabled and pending Status frames to send to the SPI Master will not go to sleep.
4. Closing a TLS session and then immediately opening a new one may result in failure. To workaround, insert a small delay (~5s). [XBCELL-3732]
5. Intermittent failure to go to sleep or wake up when using pin sleep with the SPI_nSSEL line while in SPI mode. [XBCELL-3100]
6. Versions of XCTU earlier than 6.4.2 will error out at the end of a firmware update, due to the 35 second delay on first boot. Fix: Update to the latest version of XCTU.
7. It may not be possible to interrupt MicroPython autostart if the application performs a soft reset very quickly. Workaround: delay the soft reset by a second using `time.sleep(1)`. [XBPY-796]
8. Connections to the BLE API Service within five seconds of waking from sleep can sometimes fail to perform the unlock sequence.
9. Instances where the desired BLE connection type is "Display YesNo" with legacy pairing being used the XBee will request LE Secure Connections instead of using "Just Works". This will cause the XBee to fail to pair as LESC will be disabled on the other device. [XBPY-862]
10. DNS resolution of host names containing only numerals fail, host names like 411.org and

- 0.time.devicecloud.com will fail to resolve.
11. For UDP sockets, it is required to either connect or bind the socket before being able to use send or sendto.

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/Module 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: 1. [Update to latest firmware from XCTU](#)

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

3101A (September, 2022)

This is a recommended release.

NEW FEATURES

1. ATRJ added to report the network reject code if supplied.
2. The **ATFC** command has been added to read the EARFCN of the current cellular connection.
3. **DO** can now be set to 6, which enables mirroring of the cellular component power status. When **DO** is 6, DIO0 will read high (3.3V) when the cellular component is powered and active, and will read low (0V) when the cellular component is inactive. See the documentation for additional details.
4. When entering command mode from the MicroPython REPL (ATAP=4), MicroPython will hold output until leaving command mode.
5. MicroPython adds `digi.cloud.Console()` class to communicate with the Digi Remote Manager's Console tab. [XBCELL-4486]
6. MicroPython adds `uos.dupterm()` method to redirect MicroPython terminal to another stream-like interface (e.g., `machine.UART(1)`, `digi.cloud.Console()`). [XBPY-909]
7. A new Remote Manager data services device request with the target of 'format' has been added. Upon receipt of this request the XBee will format its filesystem. [XBCELL-6141]
8. The built-in function `enumerate` is now available in MicroPython. [XBPY-77]
9. **ATOT** command has been added to read the active technology for the current network connection.

10. Added support for reporting more detailed socket close reasons.
11. For performance reasons, filesystem writes are no longer synced to the device on each write operation. To avoid data loss when writing files, be sure to close the file before shutting down or resetting the XBee. If writing to a file using MicroPython, you may also call the `flush()` method of the file object, or use `os.sync()`, without closing the file. This change does not impact applications which are not writing data to the XBee's filesystem.
12. The Digi Remote Manager default keepalive intervals have been increased to reduce data usage and align with network provider guidance.
13. Added support for Active Scan in MicroPython. [XBCELL-6307]
14. Added support for reporting Timezone when using ATDT1. [XBCELL-7785]
15. Updated MicroPython to version 1.18.
16. The AI value 0x30 (update in progress) is now applied for the XBee firmware as well. [XBCELL-5629]
17. Added support for reporting Timezone offset using `time.tz_offset()` as seconds west from UTC. [XBCELL-7784]
18. Allow MicroPython floats as values in Remote Manager data points.
19. Added AT command for performing a MicroPython Soft Reset: ATPYR [XBPY-431]
20. Added support for MicroPython `boot.py`, for consistency with other MicroPython platforms. [XBPY-167]
21. Added support for sending Python control commands through Remote Manager. [XBCELL-6885]
22. Additional fields added to ATAS cell scan results. Exact fields vary based on variant and cell technology but include ARFCN, PCID, RSRQ, and Timing Advance.
23. Added option for reporting serving cell info to Digi Remote Manager as a health metric. [XBCELL-8977]

BUG FIXES

1. DNS results are now cached for up to 24 hours, and cached results are now retained when the XBee goes to sleep (pin sleep, cyclic sleep, or `xbee.sleep_now(...)` in MicroPython). Note that this refers to the XBee's DNS cache for the ATLA command, `socket.getaddrinfo(...)` in MicroPython, configured hostnames such as the ATDL and ATEQ commands, and other connections or transmissions to hostnames. Previously, DNS results would be cached for less than an hour and would be lost during sleep, causing extra DNS lookup activity and some additional data usage. (DNS results are cached for one day or the TTL value specified by the nameserver, whichever is shorter.) [XBCELL-6545]
2. A Filesystem Request API frame with Get Path ID command and a pathname which resolves to the root directory (`/`) now correctly releases the Path ID. Updating a path ID with an absolute pathname now functions properly. [XBHAWK-578, XBPY-905]
3. Fixed an issue with API mode and ATIP 0 (UDP) where a TX IPv4 UDP frame with source port matching ATC0 would generate a TX status 0x81 ("Connection lost") after disassociating from the network and reassociating. [XBCELL-6852]
4. Fixed an issue where certain AT commands would fail to generate a response in command mode. [XBCELL-6884]
5. Fixed an issue where using ATPG with a nonexistent hostname would delay or cause temporary errors in subsequent activities.
6. Fixed an issue with the filesystem giving "ENODEV hardware failure" errors if the XBee was reset while asleep. [XBCELL-4378]
7. Attempting to rename a secure file now errors out with EPERM. [XBCELL-7071]
8. Fixed an issue where `select.select()` on a UDP socket could indicate readable without any received data available. [XBCELL-7295]

9. Fixed an issue where the AI command could return 0x2D (shutdown) before or after XBee sleep when no modem shutdown has taken place. [XBCELL-7361]
 10. Return an error on UDP sockets if send/sendto is called before connect/bind. Previously, send/sendto would fail to actually send the message. [XBCELL-7177]
 11. The `network.Cellular()` object in MicroPython will now block and attempt to perform the `shutdown()` operation while an update of the cellular component or XBee itself is in progress. The operation will fail by raising an `OSError` with value `EAGAIN`.
 12. In MicroPython, maximum UDP TX datagram sizes are now enforced. `OSError EMSGSIZE` will be returned if a datagram is too large to send. [XBCELL-7783]
 13. Improve reliability of receiving SMS messages. [XBCELL-8356]
 14. When creating a TLS socket in MicroPython, the minimum TLS version that should be allowed is now pulled from the `ATTL` value. [XBCELL-8444]
 15. Improve retrieving the IMSI value from the SIM on certain providers that can change the IMSI while running. [XBCELL-6463]
 16. Fixed an issue where under some circumstances, `FTP_OTA` device requests sent through Digi Remote Manager could result in attempting to download an incorrect filename. [XBCELL-8835]
 17. Fixed an issue where a modem status would be sent prematurely when a FOTA, initiated through `DRM`, is successful. [XBCELL-8836]
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31016 (September 18, 2020)

This is a recommended release.

NEW FEATURES

1. Added support in MicroPython for doing nonblocking socket `connect()` calls.
2. The **BP** command has been added to allow adjustment of the BLE advertisement power level.
3. Added `xbec_connect` method to the `digi.ble` module. This method wraps a `gap_connection` object and will authenticate and allow API frame access to another XBee3 over BLE.
4. Added support for 4 digit short code SMS targets (P#, 0x1F frames and `sms_send()` in MicroPython)
5. Added BLE pairing and bonding support for MicroPython GATT client connections. See the MicroPython Programmers Guide for API documentation and the `xbec-micropython` repository for samples.
6. Updated MicroPython to version 1.12. This does change the bytecode format requiring recompilation of program code.
7. The ER (for TCP) and ES (for UDP) AT commands have been added to allow override of the IP ports used for Remote Manager.
8. A command to specify Remote Manager idle timeout (ATMT) has been added. Remote Manager connections will be closed when there is no activity for this time. MT does not apply when persistent connections have been configured (ATMO bit zero is set).
9. Added new Digi Remote Manager health metrics, which can be enabled with the `ATHM` command, see documentation for details:
 - o Cellular Reference Signal Received Power (RSRP)
 - o Cellular Reference Signal Received Quality (RSRQ)
 - o Module temperature
 - o TCP and UDP application data counters
 - o Internet link deactivations

- Sleep count
- 10. The ATPG (Ping) command has been added to assist in network diagnostics.
- 11. Digi's version of MicroPython now allows for step sizes other than one in slicing bytes and string objects.
- 12. TLS connections now use SNI (Server Name Indication).
- 13. API frames have been added to provide filesystem access. See the documentation for further details.

BUG FIXES

1. Fixed an issue in MicroPython where a `select()` call against a listen socket would always return return as 'writable'. Listen sockets are never writable. [XBCELL-5793, XBCELL-5796]
 2. Socket Status 0xCF API frames are now correctly generated if SPI mode was forced by holding DOUT low during boot. [XBCELL-6084]
 3. PWM output will now properly resume after coming out of sleep. [XBCELL-6140]
 4. Improved reliability of shutdown command and airplane mode. [XBCELL-5648, XBCELL-5676]
 5. SMS send in MicroPython properly returns an error if an update is in progress. [XBPY-542]
 6. ATAS response frames in API mode did not always contain the user-specified Frame ID. [XBCELL-6549]
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31015 (February 19, 2020)

This is a recommended release.

NEW FEATURES

1. The ATIB command was added, which controls the baud rate used by the XBee CPU to communicate with the Telit cellular chipset when using bypass mode (ATAP = 5). This command has no effect on other operating modes.
 - Note that this XBee AT command only changes the physical speed of the "host side" of this UART link; before changing a working ATIB value you must use the AT+IPR command in bypass mode to set the baud rate of the cellular chipset.
 - Depending on NVM profile configuration, use of firmware update, etc., the ATIB value may not match the actual configuration of the cellular chipset, in which case you will need to try different ATIB values until communication is restored.
2. Added support for closing all open sockets when using API Close Socket frame.
3. Add support for various line ending conventions in TLS/SSL certificates and keys.
4. Retrieving the RSRP and RSRQ LTE signal quality indicators is now possible in MicroPython and with the SQ and SW AT commands.
5. The Reboot command in Digi Remote Manager will now cleanly shut down the cellular radio before rebooting device.
6. Added `Cellular.shutdown` command in MicroPython.
7. To improve the over the air update experience:
 - The FI AT command has been added which will report the status of the last update attempt.
 - The AI command will now report the value 0x30 when an update is in progress.
 - During an update, socket or SMS creation/transmits will return an error indicating an update is in progress.

8. Bluetooth Low Energy (BLE) MicroPython APIs:
 - The `digi.ble` module is now available in MicroPython.
 - GAP scan (advertisement discovery).
 - GAP advertise (custom advertisements including beaconing).
 - GAP connect.
 - GATT client operations.
 - See the documentation for additional details.
9. Added Clean Shutdown button (ATSD command) to XCTU firmware definition file.
10. Added username (ATCU) and password (ATCW) settings that are needed by some cellular carriers to authenticate and connect to the network.
11. Added PIN (ATPN) and PUK (ATPK) settings that are needed when using a locked SIM.
12. The ATSD (Shutdown) command now takes an optional parameter to reboot the XBee after shutting down.
13. The ATP1 command has now added PWM functionality.
14. The ATDB command now can take an optional parameter to get an uncached RSSI signal value.
15. In MicroPython, slice-assignment to arrays and bytearrays is now supported.
16. The **BI** command has been added, which determines the name that appears in the XBee device's BLE advertisement data. If **BI** is set to the default value (0x20; ASCII space character), the default name of "XBee3 Cellular Cat 1 AT" will be used.
17. MicroPython has had the 'uselect' module added. This will allow cleaner asynchronous socket operations.
18. The **FO** command has been added, which is used to initiate a cellular component FTP OTA. See the documentation for usage details.
19. Increased RAM available to the MicroPython interpreter to allow for more complex applications.
20. The `ucryptolib` MicroPython module has been added allowing for hardware accelerated AES encryption/decryption in user applications.
21. Updated the XCTU firmware definition file to support cellular component firmware update over USB Direct using XCTU 6.5.0+ on Windows.
22. MicroPython now supports registering callbacks for various functions, including the following:
 - Cellular SMS
 - User Data Relay Frames
 - `micropython.schedule()`
23. 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.

BUG FIXES

1. Fixed issue with ATDT reporting a time value that was far into the future/incorrect.
2. ATPY^ now correctly interrupts a MicroPython script which has disabled keyboard interrupts using `micropython.kbd_intr(-1)`. [XBPY-446]

3. 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]
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31013 (August 7, 2019)

This is a recommended release.

NEW FEATURES

1. A new family of socket operation API frames (Create, Connect, Close, Socket Status) have been added to increase the level of control and visibility into network connection creation and management.
2. The ATSD (Shutdown) command was added. You should use the ATSD command to safely shut down a device before removing power.
3. Over-The-Air (OTA) update notifications will be sent out as modem statuses. This applies to both OTA XBee firmware and OTA cellular component updates.
4. The ATII command was added, which reads the IMSI (International Mobile Subscriber Identity) from the SIM.

BUG FIXES

1. Increase space available for phone numbers to accommodate full length international numbers including country code. [XBCELL-5110]
 2. TCP download speed was slower in 31011 than in 31010 and earlier. [XBCELL-5123]
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31011 (April 12, 2019)

This is a recommended release.

NEW FEATURES

1. Cellular Network Time command (ATDT)
 - Reports the local time of the XBee device, if time has been synchronized with the network.
 - Read the number of seconds since Jan 1 2000 00:00:00 UTC, or an ISO 8601-formatted timestamp.
2. Enhanced support for Digi Remote Manager
 - Filesystem support
 - Upload, download, list and delete files remotely using the SCI File System service or File Management UI in Digi Remote Manager.
 - SM/UDP connection management
 - In order to minimize data charges for an inactive connection, the XBee will no longer maintain an active TCP connection to DRM. DRM will periodically be polled through Digi’s SM/UDP protocol on an interval determined by the DF AT value (default of once per day). Requests to bring up and terminate a full-featured TCP connection can be made from DRM over SM/UDP.
 - The previous constantly connected behavior may be regained by setting bit-0 of the MO AT command.
 - See the documentation for additional details.
 - SMS-based connection management
 - SMS messaging from Digi Remote Manager is now supported. Requests to bring up and terminate a full-featured TCP connection can be made from DRM over SMS.
 - See the documentation for additional details.

- Configuration and status reporting
 - Read current settings, configure the XBee device, and read the XBee device's current status remotely.
 - Data point creation and upload using MicroPython
 - Create data points with integer or string values and upload them to Digi Remote Manager using MicroPython code.
 - See the documentation for additional details.
 - Device health metrics reporting
 - Configure the XBee to upload device health metrics to DRM, including cellular signal strength.
 - See the documentation for additional details.
 - Data service device request handling with MicroPython
 - Receive Data Service Device Requests from DRM using MicroPython, allowing data to be passed to and from the XBee.
 - See the documentation for additional details.
- 3. Active Scan command (ATAS)
 - Scans for mobile cells in the vicinity and returns information about the cells in the service area of the XBee.

BUG FIXES

1. Fixed security issue to make it more difficult to create a phony firmware update image. [XBCELL-4609]
 2. When SPI operation has been forced by holding DOUT/DIO13 pin 2 low while resetting the XBee, data arriving at the configured listening socket would be dropped. [XBCELL-4691]
 3. Keyboard interrupt at the MicroPython REPL only works when the interrupt byte appears first in a block of input. [XBCELL-4853]
 4. The RO parameter (packetization timeout) no longer applies when at the MicroPython REPL (AP = 4). [XBCELL-4853]
 5. Changed the device type string reported to Digi Remote Manager from XBee Cellular LTE Cat 1 AT&T to XBee3 Cellular LTE Cat 1 AT&T.
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31010 (November 2018)

This is a recommended release.

NEW FEATURES

1. Gecko Bootloader
 - Upgrade images are now .gbl files instead of .ebin files, they are compressed to reduce OTA update data usage.
 - The first boot cycle when applying an upgrade to firmware version 31010 or later will exhibit a delay of approximately 35 seconds before the XBee modem becomes responsive.
2. User Data Relay Frame
 - Relay custom user data to and from MicroPython, BLE, and the local interface.
3. MicroPython Features:
 - Flash upload mode now compiles and stores the code in the file system at /flash/main.mpy.
 - Cross compilation support using mpy-cross on a PC and uploading them to the file system.
 - The XBee adds an os.compile() method to compile .py files into .mpy files on the device itself.
 - The XBee adds an os.bundle() method to freeze multiple .mpy files into the device flash for execution in place to reduce heap usage.
4. Bluetooth Low Energy (BLE)
 - Send a subset of API frames to the XBee through the encrypted BLE API Service.

- Configure the XBee 3 Cellular using the Digi XBee Mobile app for Android and iOS.
- Added ATDV command option to use the secondary antenna as the BLE antenna.

BUG FIXES

1. Unable to delete mpy files from the file system after failing to import them. [XBPY-219]
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3100F (November 2018)

This is a gating firmware and is required to update devices on versions earlier than 31010. This gating firmware will automatically update the device to 31010 after about a minute of operation. Versions of XCTU earlier than 6.4.2 will error out at the end of the firmware update, due to the time it takes for the update to apply. Update to the latest version of XCTU to avoid this error.

This firmware will reduce the size of the file system to 420KB after formatting. The upgrade will maintain as much of the file system as possible, prioritizing files in the /flash/cert directory before files in other directories.

3100C (September 2018)

This is a recommended release.

BUG FIXES

1. Fixed issues with a memory leak when using TLS mutual authentication and additional sockets cannot be opened. [XBCELL-3861]
 2. Sequence to initially connect to cellular network improved. [XBCELL-4091]
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3100B (June 2018)

This is a recommended release.

NEW FEATURES

1. File system support
 - ATFS command to access through Command Mode
 - MicroPython file interfaces for programmatic access
 - Provides MicroPython module import support
 - Allows storage of TLS certificates for authentication
 - Secure encrypted file storage to protect MicroPython code and TLS private keys
 2. TLS Authentication
 - Accessed in MicroPython with the `ussl.wrap_socket` method
 - Configurable with the `$0/$1/$2` commands
 - Uses certificates stored on the filesystem
 - New API frame 0x23 to access multiple authentication profiles
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3100A (December 14, 2017)

This is a recommended release.

NEW FEATURES

1. Initial release
2. Key features:
 - Digital I/O support.
 - Analog Input support.
 - API & Transparent mode
 - AT command mode
 - By-pass to raw cellular module
 - SMS
 - TCP/UDP (up to ten sockets)
 - TLS/TCP (up to six socket)
 - Incoming connections
 - MicroPython!
 - On-device programmability to add local intelligence.
 - Many examples in the Digi MicroPython Programmer Guide.
 - AT commands for managing run-time behavior.
 - Low power modes
 - Deep sleep mode.
 - Pin sleep support.
 - Cyclic sleep support.
 - Airplane mode sleep support.
 - SMS UTF-16/UCS-2 encoding support.

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