Release Notes
BL654 and BL654PA

Version 29.4.6.6  Jun 2020

Release notes are a summary of new and enhanced features, resolved issues, and known issues that are not resolved in this firmware version. This release note describes the changes and enhancements to the firmware of the BL654 smartBASIC based Bluetooth Low Energy Module in reverse chronological order.

For each version (excluding the initial 29.1.1.0) there are subsections for ‘New Features’, ‘Bug Fixes’ and ‘Known Issues’.

BL654 firmware version numbers consist of four numbers in the format W.X.Y.Z which can be read back from the module by submitting the command AT I 3 when it is in command mode.

W signifies the module ID, which in the case of BL654 is 29.

X is used to indicate the underlying BLE stack version and so far the values have been:

1  Production release of Nordic’s Softdevice version 6.0.0
2  Production release of Nordic’s Softdevice version 6.1.0
3  Production release of Nordic’s Softdevice version 6.1.1
4  Production release of Nordic’s Softdevice version 7.0.1

Y is the release version, i.e. the major build number

Z is a sub-build number. When it is 0 or an even number it signifies that the firmware image is a production image that has been fully regression tested. An odd number indicates an engineering image.

- Version 29.4.6.6
- Version 29.4.6.0
- Version 29.3.5.0
- Version 29.3.3.0
- Version 29.2.2.0
- Version 29.1.1.0

Version 29.4.6.6

June 2020

This firmware is built to work with v7.0.1 of the S140 Softdevice from Nordic Semiconductor which is BT Spec version 5.1 qualified. The firmware is for both BL654 and BL654PA modules.

New Features

**smartBASIC**

- SetREGOUT0 and GetREGOUT0 functions added to set/get register value that sets VDD to power external components while the module is operating in high voltage mode. (Bug 16469)
- Hash: Added new hashing functionality. (Bug 16409)
- Crypto: Added extended AES functions for 256-bit encryption. (Bug 16409)

Changes

- Flash space available for smartBASIC applications is increased from 64 KB to 80 KB. (Bug 16518)
- The high bandwidth mode (and corresponding configuration key) no longer has any effect. This functionality was replaced with connection set-aside time configuration. Note that applications that set the high bandwidth configuration value will still seem to set them correctly but will not have any change on module/radio configuration. (Bug 16533)
Resolved Issues

BL654PA

- Max packet length can be set to 200 bytes on 1M and 2M PHY at +18 dBm. (Bug 16002)

BL654 and BL654PA

- smartBASIC function sysinfo$(2) now returns product name as a string. (Bug 16333)
- Advert properties for LE Coded PHY are fixed so they can be scannable. (Bug 16364)
- Fixed REGOUT0 AT command so that any attempt to overwrite it returns an error message instead of corrupting the value. (Bug 16195)
- Configuration that has not been written successfully is now reset to defaults instead of continuing to run with missing settings. (Bug 16283)
- The 32-KHz clock source is no longer set to the external crystal during module startup unless this configuration option is specifically set. (Bug 16499)
- A memory leak caused when using extended advertising sets has been fixed. (Bug 16833)
- BLEConnect now reads configuration which has been set using BLEConnectConfig. (Bug 16842)
- DTM no longer toggles SIO_3 and SIO_4. (Bug 16828)

Known Issues

BL654PA

- While operating in peripheral mode, a central device may change the channel mask. Transmit power will be limited to +14 dBm at this point to keep the BL654PA within regulatory limits. (Bug 16823)

VERSION 29.4.6.0

December 2019

This firmware is built to work with v7.0.1 of the S140 Softdevice from Nordic Semiconductor which is BT Spec version 5.1 qualified. The firmware has NOT been tested on a BL654PA module.

New Features

The following are new features in the current version. Please refer to the manual for additional information and usage.

smartBASIC

- Added StrEncodeXXX() and StrDecodeXXX() functions. See details in updated core user guide.
  - So that AD elements can be read/written into large adverts
- Capability to send and receive adverts up to 255 bytes long on any PHY.
- LE_CODED connections can be initiated off LE_CODED adverts hence long-range reconnection.
- Added new extended adverts functions as follows:
  - BleAdvSetCreate()
  - BleAdvSetNewData()
  - BleAdvSetStart()
  - BleAdvSetStop()
  - BleScanStartEx()
  - BleExtAdvRptEnd()
  - BleExtAdvRptAppendAD()
- Added the following new events related to extended adverts (see user guide for details):
  - EVBLE_EXTADV_END
  - EVBLE_EXTADV_RPT
  - EVBLE_EXTSCN_RPT
  - EVBLE_EXTADV_RPT_INCOMPLETE
    - Added new function to use static pass key: BlePairingStaticPasskey()
    - Added new config key 217 to specify max advert sets. Currently limited to just one.
- Added new config key 218 to specify reserved max time for packet transmissions in a connection interval.
- Up to 180 KByte of RAM is now available for smartBASIC use instead of just 16 Kbyte.
- When scanning is aborted due to a connection initiation, event EVBLE_SCAN_ABORTED is sent to the application.

**Changes**

- No changes to existing functionality.

**Resolved Issues**

The following issues have been resolved in this release:

- Provided a fix to internal helper function that walks an advert report to check if an AD element already exists.
- Previously, BleSetTxPower() was failing before any adverts were started. This issue is fixed.
- In DTM mode, only the first 32 GPIO pins could be manipulated. With this release, all 48 can be manipulated.
- AT I 2021 and SYSINFO(2021) now works properly to return stack tide mark.
- Intermittent high current usage after floating point operation is now fixed.
- Fixed memory leak that occurred when scanning and then a connection was initiated because scanning was aborted.

**Known Issues**

- Writing REGOUT0 more than once corrupts the value of this register instead of returning an error. Flash should be erased and reprogrammed with 29.4.6.0 firmware image if this occurs. (Bug 16195)

**VERSION 29.3.5.0**

*July 2019*

This firmware is built to work with v6.1.1 of the S140 Softdevice from Nordic Semiconductor which is BT Spec version 5.0 qualified. It is a combined image that will work with standard BL654 and also with BL654PA after a one-time firmware configuration using the AT+PALNA command.

**New Features**

The following are new features in the current version, please refer to the manual for usage.

**PA**

- Unified firmware for PA/non-PA variants of the BL654
  - The command AT+PALNA is used to persistently morph the module into the PA variant
  - PA variant allows up to +18 dBm transmit power

**smartBASIC:**

- GpioBindEvent() can detect changes in 8 inputs, increased from 4, hence 4 new events added
- Enhanced UART api so that CTS changes can be configured to send new EVAUXCTS or EVUARTCTS events
- Added AT+CFG 120 key which allows nAutorun to be any allowable gpio and also allow setting of active state
- Added StrMove() and StrExchange() core functions to improve speed in buffer management
- Added UartIoctl() function to allow RTS/TX output drive control (e.g. open drain)
- Added AuxIoctl() function to allow RTS/TX output drive control (e.g. open drain)
- Added Floating Point capability

**Changes**

- DTM: Functionality updated to v5 from SDK v15.2.
Resolved Issues

The following issues have been resolved in this release:

- Negative temperature readings incorrectly returned by SYSINFO(2014) (Bug: 14729)
- Intermittent high doze current after floating point is used (Bug: 14664)
- Unexpected behavior when connecting while scanning (Bug: 14210)
- Some warm reset based commands were not sending OK post reset
- When xcoping a long-dash character (ascii 0x96) did not result in syntax error
- Missing binary operator in arithmetic expression was not detected as an error

Known Issues

The following are known issues in this release:

- Advertising extensions is only provided as an experimental feature in this release and the API may be modified and updated in future releases.
- During a BLE connection, when a GATT service is changed in a GATT server, the GATT client does not receive an event notifying it of the change (9628).
- For the GATT server, the long writes feature on authorizable characters is not yet implemented and will be added in future releases (11193).
- NFC FIELD ON event is not triggered when field sensing is disabled then enabled (Bug 13244).

Version 29.3.3.0

December 2018

This firmware is built to work with v6.1.1 of the S140 Softdevice from Nordic Semiconductor which is BT Spec version 5.0 qualified.

New Features

The following are new features in the current version, please refer to the manual for usage.

- **QSPI**: Added the ability to allow BL654 to operate as a QSPI master.
- **BLE**: Maximum number of connections increased from 8 to 16.
- **BLE**: Added ability to set channel map from smartBASIC application.
- **CRC**: added CRC16 and CRC32 error detection functions.
- **Moved to Softdevice v6.1.1 and SDK 15.2.0.**

Changes

- **VSP**: VSP via indicate feature is no longer supported.

Resolved Issues

The following issues have been resolved in this release:

- **BLE** – Fixed a bug where invalid latency limit was calculated (12463)
- **UART** – Fixed a bug where standby doze (SYSTEM ON IDEL) current was not achieved (13699)
Known Issues

The following are known issues in this release:

- Advertising extensions is only provided as an experimental feature in this release and the API may be modified and updated in future releases.
- During a BLE connection, when a GATT service is changed in a GATT server, the GATT client does not receive an event notifying it of the change (9628).
- For the GATT server, the long writes feature on authorizable characters is not yet implemented and will be added in future releases (11193).
- NFC FIELD ON event is not triggered when field sensing is disabled then enabled (Bug 13244).

Version 29.2.2.0

August 2018

This firmware is built to work with v6.1.0 of the S140 Softdevice from Nordic Semiconductor which is BT Spec version 5.0 qualified.

New Features

The following are new features in the current version, please refer to the manual for usage.

- **LESC**: Added fix for Bluetooth vulnerability VU#304725 where public keys weren’t validated during LESC pairing.
- **BLE**: Advertising, scanning and connecting over CODED PHY is now supported.
- **Watchdog**: Exposed Watchdog timer functionality through smartBASIC API.
- **SPI Slave**: Added SPI Slave API to allow the BL654 to operate as an SPI Slave peripheral.
- **UART**: Added new API to allow the second UART peripheral to be used.
- **Flash**: Added new high-level API for accessing external flash.
- **Moved to Softdevice v6.1.0.**

Resolved Issues

The following issues have been resolved in this release:

- **DTM** – Added missing Tx power values (2dBm, 5dBm, 6dBm, 7dBm and 8dBm).
- **DTM** – Fixed sensitivity issues on engineering B and C silicon.
- **BLE** – Fixed an issue where a connection timeout event was being thrown instead of a scanning timeout event (13196).
- **SPI** – Fixed bug where SPI operation would hang if the bus is not correctly configured (13287).

Known Issues

The following are known issues in this release:

- Advertising extensions is only provided as an experimental feature in this release and the API may be modified and updated in future releases.
- During a BLE connection, when a GATT service is changed in a GATT server, the GATT client does not receive an event notifying it of the change (9628).
- For the GATT server, the long writes feature on authorizable characters is not yet implemented and will be added in future releases (11193).

Version 29.1.1.0

May 2018
This firmware is built to work with v6.0.0 of the S140 Softdevice from Nordic Semiconductor which is BT Spec version 5.0 qualified.

**Known Issues**

The following are known issues in this release:

- CODED PHY functionality is not Bluetooth qualified in this release. This feature is available for development and testing purposes only.
- Advertising in CODED PHY is not supported and will be provided in future versions of the firmware.
- During a BLE connection, when a GATT service is changed in a GATT server, the GATT client does not receive an event notifying it of the change (9628).
- For the GATT server, the long writes feature on authorizable characters is not yet implemented and will be added in future releases (11193).

**Further Information**

Further information relating to the BL654 and its firmware is available from the Laird website at https://www.lairdconnect.com/wireless-modules/bluetooth-modules/bluetooth-5-modules/bl654-series-bluetooth-module-nfc