Release Notes

BL654 and BL654PA

Version 29.4.6.0   *Dec 2019*

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 *smart*BASIC 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 29.4.6.0 (DEC 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. ~~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.~~ 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 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()
        - BleExtRptMetadata()

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- BleConnectExtended()
- BleExtAdvRptAppendAD()
- BleExtAdvRptAddUuid16()
- BleExtAdvRptAddUuid128()
- BleExtAdvRptGetSpace()
- 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 new config key 217 to specify max advert sets. Currently limited to just 1.
- Added new new config key 218 to specify reserved max time for packet transmissions in a connection interval
- Up to 180KByte of RAM is now available for smartBASIC use instead of just 16KByte
- 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:

- Fix to internal helper function that walks an advert report to check if an AD element already exists.
- BleSetTxPower() was failing before any adverts were started
- In DTM mode only first 32 gpio pins could be manipulated – not all 48 can be
- AT I 2021 and SYSINFO(2021) now works properly to return stack tide mark
- Intermittent high current usage after floating point operation now fixed
- Memory leak fixed when scanning and then a connection is initiated because scanning is aborted.

VERSION 29.3.5.0 (JUL 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 +18dBm 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)
▪ sampe sb apps were using AssertBL652() instead of BL654()
▪ Some warm reset based commands were not sending OK post reset
▪ When xcompiling 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 (DEC 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.
▪ nRFx-Command-Line-Tools updated to version 9.8.1.
▪ 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 (AUG 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.lairdtech.com/products/bl654-ble-thread-nfc-modules