BL600 Firmware Release Notes

OVERVIEW

This release note describes the changes and enhancements to the firmware of the BL600 *smart*BASIC based Bluetooth Low Energy Module in reverse chronological order.

For each version (excluding the initial 1.1.50.0) there are subsections for 'Enhancements', 'Bug Fixes' and 'Known Issues'.

BL600 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 is 1 to signify that it has Peripheral Role capability only.

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

0	An alpha release of the Nordic S110 softdevice BLE Stack
1	Nordic S110 Softdevice Stack version 5.0.0
2	Nordic S110 Softdevice Stack version 5.1.0
3	Nordic S110 Softdevice Stack version 5.2.0
4	Nordic S110 Softdevice Stack version 5.2.1
5	Nordic S110 Softdevice Stack version 6.0.0

Y is the build number and when it is an even number it is a production image and when an odd number it is an engineering image.

Z is a sub-build number. When it is 0 or an even number it signifies that the firmware image has been fully regression tested. When both X and Y is odd, it will usually be the case that the firmware image was released to do a quick field test and a full regression test will not have been performed on it.

1   Version 1.5.70.0 (Apr 2014)

This firmware is built to work with v6.0.0 of the S110 Softdevice from Nordic Semiconductor and the enhancements and bug fixes since the previous production release 1.5.66.0 are as described below and refer to the user manual for more specific details.

1.1   Migration from earlier firmware

Please refer for further details in the user manual

* None

1.2   Enhancements

1. Uart IRQ is gated so that if a nested IRQ happens then it is serviced again in a synchornised fashion

2. Rbf Wrap buffer, head and tail pointer updates now ensure that at no time so those pointers point outside the buffer when the wrap occurs

1.3   Bug Fixes

1. In conditions of high uart activity due to high virtual serial port data activity there was data corruption on the uart arising from the temporary assignment of a tail pointer of the ring buffer outside the size of the buffer. There was a race condition.

2. AT+CFG 115 115200 was not working as a result of limit checking and the fact that the config store is only 16 bits and so a value /100 is stored. Fixed so that limits are now applied correctly

1.4   Known Issues

1   No known issues.

2   Version 1.5.66.0 (Apr 2014)

This firmware is built to work with v6.0.0 of the S110 Softdevice from Nordic Semiconductor and the enhancements and bug fixes since the previous engineering release 1.5.65.0 are as described below and refer to the user manual for more specific details.

2.1   Migration from earlier firmware

Please refer for further details in the user manual

- The nOffset parmeter in function BleGattcWrite() and BleGattcWriteCmd() is not required and so has been removed.
  Remove that parameter where you invoke the functions and the application will compile again.

2.2   Enhancements

3. Added the following new smartBASIC functions:-
    UartReadN()

2.3   Bug Fixes

3. BlePubGapServiceDeviceNameGet() was using nLen with arbitrary value from stack this resulted in the wrong length being returned

4. AesEncrypt(), when in EBC mode and a plaintext string less than 16 bytes was supplied was resulting in memory corruption resulting in a hard fault.

2.4   Known Issues

2   No known issues.

3   Version 1.5.65.0 (Feb 2014)

This firmware is built to work with v6.0.0 of the S110 Softdevice from Nordic Semiconductor and the enhancements and bug fixes since the previous production release 1.5.62.0 are as described below and refer to the user manual for more specific details.

Main headline enhancements:-

- File I/O Capability
- AES Cryptographic functions.
- Added tokeniser functions to aid uart protocol development
- Added functions for easier access to AD elements in advert reports
- GPIO output can be configured for high drive as well as standard drive

3.1   Migration from earlier firmware

Please refer for further details in the user manual

- None

3.2   Enhancements

4. Added the following new smartBASIC functions:-
   ExtractStrToken()
   ExtractIntToken()
   FOPEN()
   FCLOSE()
   FREAD()
   FREADUNTIL()
   FTELL()
   FSEEK()
   FILELEN()
   AesSetKeyIV()
   AesEncrypt()
   AesDecrypt()
   BleServiceNew()
   BleServiceCommit()
   EraseFileSystem()
   BleGetADbyIndex()
   BleGetADbyTag()

5. GpioSetFunc() enhanced so that when setting a pin as outout, the drive capability can be specified: standard, high or disconnected for states 0 or 1

3.3   Bug Fixes

5. No bug fixes.

3.4   Known Issues

3   No known issues.

4   Version 1.5.62.0 (Jan 2014)

This firmware is built to work with v6.0.0 of the S110 Softdevice from Nordic Semiconductor and the enhancements and bug fixes since the previous production release 1.3.57.0 are as described below and refer to the user manual for more specific details.

Main headline enhancements:-

- Gatt Client Capability

- Automatic Whisper mode while pairing giving enhanced proximity based pairing. See new function BleTxPwrWhilePairing().

- smartBASIC runtime engine optimised to give 30% speed improvement

4.1   Migration from earlier firmware

Please refer for further details in the user manual

- Event message EVCHARVAL now supplies 3 parameters instead of just 1

- Function BleCharDescAdd() now takes a uuid handle instead of a just a 16bit uuid.

- Function BleCharDescRead() now takes 2 extra parameters

- Event message EVCHARDESC : meaning of second parameter has changed.

4.2   Enhancements

6. Added the following new smartBASIC functions:-
    BleTxPwrWhilePairing()

7. Added the following new GATT Client related smartBASIC functions:-
    BleGattcOpen()
    BleGattcClose()
    BleDiscServiceFirst()
    BleDiscServiceNext()
    BleDiscCharFirst()
    BleDiscCharNext()
    BleDiscDescFirst()
    BleDiscDescNext()
    BleGattcRead()
    BleGattcReadData()
    BleGattcWrite()
    BleGattcWriteCmd()
    BleGattcNotifyRead()

8. Added the following new event messages related to GATT Client:-
    EVDISCPRIMSVC
    EVDISCCHAR
    EVDISCDESC
    EVATTRREAD
    EVATTRWRITE
    EVGATTCTOUT

9. Added the ability to automatically reduce TX power while pairing is in progress

10. Functions NvRecordGetxxx() now limit the range of keyId.

11. BleCharValueWrite() now allows writing to local attribute data buffer even if there is no connection

4.3   Bug Fixes

6. Function UartCloseEx() was setting a poiner to a driver object to NULL even though the uart was not closed (when conditions were not satisfied).

7. If only one byte read from full rx buffer it was not staying in buffer full state

8. I2C Bug Fix: The master in BL600 was not letting the SDL line go to input mode in time for the ACK pulse from the slave. This resulted in some slaves with not working as their TX output was not strong enough to overcome the TX out.

9. When listing bonding information the correct MAC address is returned and not the resolvable private address

10. When whitelist enabled and iOS device was bonded a resolvable address was being supplied in the whitelist which got rejected by the stack.

11. If a SCCD is updated by a client, then a CCCD specific event message was thrown, never the SCCD specific one.

4.4   Known Issues

4   No known issues.

5   Version 1.3.57.0 (Sep 2013)

This firmware is built to work with v5.2.0 of the S110 Softdevice from Nordic Semiconductor and the enhancements and bug fixes since the previous production release 1.2.54.0 are as described below and refer to the user manual for more specific details.

Main headline enhancements:-

- The ability to output a PWM or FREQ output on up to 2 gpio output pins.

- The ability to detect that a writable device name has been written and then to be able to get the new value from the gatt table

- New functions to be able to detect gpio input change with no current consumption cost which means it is possible to close the uart and get to the 4uA current consumption regime and yet still be able to detect for incoming data and be woken up so that the uart can be re-opened at the expense of losing that first incoming character.

- The ability to read the current MAC address from within a smartBASIC application

- A new helper function to bridge the uart and a virtual serial port service.

5.1   Enhancements

12. Added the following new smartBASIC functions:-
    BleGetDeviceName$()
    GpioAssignEvent()
    GpioUnAssignEvent()
    UartCloseEx()
    SysInfo$()
    BleVspUartBridge()
    GpioConfigPwm()

13. Added the capability to output a PWM signal or a frequency output on up to 2 gpio pins simultaneously. Note in total only 2 outputs can be configured as PWN and/or FREQ output.

14. Enhanced GpioSetFunc() so that when OUTPUT type is specified, the subfunction can be used to specify PWN or FREQ as well.

15. Added the EVBLEMSGID_DEVICENAME_WRITE sub-message id associated with the EVBLEMSG event which is thrown to the smartBASIC runtime when gatt client writes a new device name. The handler can use the new function BleGetDeviceName$() to read the new name.

16. Added the following new events and messages that a smartBASIC app can handle:-
    EVDETECTCHAN0   (associated with the new GpioAssignEvent() function)

17. If Limited Discoverability mode is advertised in the Flags AD element and the advert timeout is set to 0 then the timeout is clipped to 180 seconds.

18. The smartBASIC function UARTINFO() now takes id 5 and 6 to return uart related information which is useful to optimise current consumption when using the uart.

19. The smartBASIC function SYSINFO$(4) now returns the current Bluetooth mac address to the running smartBASIC application

20. Build process now generates a ,syn file for enhanced color syntax highlighting for the TextPad editor.

21. Added new interactive command AT+CFG which deprecates the use of AT+SET and AT+GET. The format for AT+CFG is now more user friendly.

    AT+CFG num value :- used for updating a non-volatile value
    AT+CFG num :- used to read a non-volatile value

22. Modified the 'nFlags' parameter supplied to BleVspOpen() so that if bit 1 is set then it suppresses creation of modem in/out characteristics.

23. Added Virtual Serial Port related non-volatile registers that are read or writing using AT+CFG as follow:-
    113   UWKEY_VSPP_ONCMDBRIDGE_ADVERT_INTERVAL_MS
    114   UWKEY_VSPP_ONCMDBRIDGE_ADVERT_TIMEOUT_SEC
    115   UWKEY_VSPP_ONCMDBRIDGE_BAUDRATE
    116   UWKEY_VSPP_ONCMDBRIDGE_LATENCY_MS

24. Updated Virtual Serial Port behaviour so that when modem characteristic is active the virtual RTS is deasserted when space < 80 and re-asserted when space >= 120

5.2   Bug Fixes

12. In UART driver when RTS is deasserted the last character is no longer lost when ring buffer is full.

13. If a timer that was not running is checked to see if it is running, then in some circumstances a NULL was being dereferenced.

14. When renaming a file in the file system, if the filename started with the '_' character then it used to fail.

15. Bug fix in DriverPubNrf51Gpio_BindEvent() which prevents the same channel to be used again if it happened to be channel 0

5.3   Known Issues

5   No known issues.

6   Version 1.2.54.0 (Jun 2013)

This firmware is built to work with v5.1.0 of the S110 Softdevice from Nordic Semiconductor and the enhancements and bug fixes since the previous production release 1.1.50.0 are as described below and refer to the user manual for more specific details.

6.1   Enhancements

25. Added capability so that any BLE services and characteristics can now be added at runtime using new smartBASIC functions. **This means custom and any future adopted services do NOT require new firmware from Laird to implement**.

26. Added flash upload capability over the uart so that Laird's smartBASIC firmware image can be upgraded over the uart using a new UwFlash utility. Note the underlying SoftDevice image from Nordic still needs the JLINK for upgrade.

27. Added the following new smartBASIC functions:-
    BleCharNew()

BleCharCommit()
BleSvcCommit()
BleSvcAddIncludeSvc()
BleCharValueWrite()
BleCharValueNotify()
BleCharValueIndicate()
BleCharValueRead()
BleCharDescRead()
BleHandleUuid16()
BleHandleUuid128()
BleHandleUuidSibling()
BleAttrMetadata()
BleCharDescUserDesc()
BleCharDescPrstnFrmt()
BleCharDescAdd()
BleAdvRptGetSpace()
BleAdvRptAppendAD()
BleEncode8()
BleDecodeS8()
BleDecodeU8()
BleEncode16()
BleDecodeS16()
BleDecodeU16()
BleEncode24()
BleDecodeS24()
BleDecodeU24()
BleEncode32()
BleDecode32()
BleEncodeFLOAT()
BleDecodeFLOAT()
BleEncodeSFLOAT()
BleEncodeSFLOATEX()
BleDecodeSFLOAT()
BleEncodeTIMESTAMP()
BleDecodeTIMESTAMP()
BleEncodeSTRING()
BleDecodeSTRING()
BleEncodeBits()
BleDecodeBits()
BleVSpFlush()
CircBufCreate()
CircBufWrite()
CircBufOverWrite()
CircBufRead()
CircBufItems()
CircBufDestroy()
BleSetCurConnParms()
BleGetCurConnParms()
BleConnMngrUpdCfg()

28. Added the following new events and messages that a smartBASIC app can handle:-
EVVSPTXEMPTY
EVCHARDESC
EVDISCON

EVBLEMSGID_ENCRYPTED
EVBLEMSGID_UNENCRYPTED
EVBLEMSGID_CONN_TO_BONDED_MASTER
EVBLEMSGID_UPDATED_BOND
EVCHARSCCD
EVCHARCCCD
EVCHARHVC
EVCHARVAL
EVCHARDESC

29. Enhanced SYSINFO() function (and thus the AT I command too) so that the following new information can be extracted :-
    `0x8000 to 0x81FF`   returns the FICR registers at offset 0x000 to 0x1FF
    2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016

30. A minimal app with just the start advert function and the waitevent will now advertise the device name "LAIRD BL600"

31. Enhanced the algorithm for checking connection parameters on connection.

32. Connection parameter renegotiation is now state machine based.

33. Asserts will now result in a message dump over the uart @9600N81 and the module will automatically reset to ensure it does not sit is an infinite loop and thus drain the battery.

34. All unhandled interrupts and hardware fault exception now result in a stack reset, message dump over uart @9600N81 and then a reset. Again this prevents an infinite loop which will result in a battery drain.

35. Capability to download smartBASIC applications into the module's file system over the air. A Windows PC utility is under development and will be provided for free as soon as it is released.

36. Added a managed Virtual Serial Port Service which allows bi-directional streaming data exchange. This managed service has ring buffers for both rx and tx which sit on top of the service characteristics and is available in both command and run mode. In command mode it is provided to facilitate smartBASIC application download over the air in production (SIO7 has to be pulled high to enable this feature). In run mode see the new function VSPxxxx().
    In command mode the virtual Serial Port Service operates at a reduced transmit power of -12dBm so that multiple programming stations in a production environment will interfere with each other less.

37. Added Non-volatile Configuration keys to modify behaviour of certain features when in command mode (like the Virtual Serial Port). The following new keys (accessible via the AT+SET and AT+GET commands) are available (more details in user manual):-
    SERVICE_ENABLE_VSP_ONCMD
    VSP_ONCMD_MAKE_RELIABLE
    VSP_ONCMD_ADVERT_INTERVAL_MS
    VSP_ONCMD_ADVERT_TIMEOUT_SEC
    VSP_NOTIFYBUF_LOW_THRESHOLD
    VSP_ONCMD_MIN_CONN_INTERVAL_SLOTS
    VSP_ONCMD_MAX_CONN_INTERVAL_SLOTS
    VSP_ONCMD_CONN_SUPVSN_TOUT_MS
    VSP_ONCMD_SLAVE_LATENCY
    VSP_ONCMD_TXPOWER_DBM
    VSP_ONCMD_TXBUF_SIZE

VSP_ONCMD_RXBUF_SIZE
VSP_UUID_BASE_INDEX

38. Heap memory size reduced to 4384 from 4480.

39. By default SIO7 pin now has an internal pull down resistor by default so that an unconfigured module will NOT add Virtual Serial Port Service to the Gatt Table on power up for command mode. The pin needs to be pulled high externally on the users device to enable smartBASIC apps download over the air.

40. The internal DCDC convertor is now switched off on Nordic's recommendation until a future release of the softdevice stack.

41. Asserting a BREAK on the receive line of the uart interface will put the module into deep sleep mode. Releasing BREAK will force it to active mode via the reset vector. As long as the UART interface is open this provides a convenient method of resetting the module without resorting to a physical line to the RESET pin of the module. Please note, this is only available when the UART is open – hence not a universal alternative to actually asserting the RESET pin on the module.

6.2   Bug Fixes

16. When setting up a signal i/o for DIGITAL INPUT functionality the subfunction mask is correctly interpreted.

17. When a smartBASIC app is STOPped inside a routine and then ABORT is invoked by the user the local variables stack for a subsequent application that is launched is out of sync.

18. The cross-compiler now displays an error line correctly

19. Bonding manager and whitelist management is now implemented correctly.

20. The command AT&F* now also deletes the Bonding Database

21. Blood Pressure units are now processed correctly.

6.3   Known Issues

6   A filename which includes the character '_' cannot be renamed.
Workaround:
Delete the file using AT+DEL
Rename the .sb file so that it has the filename you want in the module's file system and reload. Note if the file system is full you will have to delate all using at AT&F* command.

7   For function GpioBindEvent() if nPolarity argument is not 0,1 or 2 then it behaves as if the value was set to 0 rather than returning an error.

7   Version 1.1.50.0 (Apr 2013)

This firmware is built to work with v5.0.0 of the S110 Softdevice from Nordic Semiconductor and was the first production release.

8   Further Information

Further information relating to firmware and the use of UWTerminal is available from the Laird website at http://www.lairdtech.com/Products/Embedded-Wireless-Solutions/Bluetooth-Radio-Modules/BL600-Series