BLUETOOTH DUAL MODE SOFTWARE

RELEASE NOTES

Wednesday, 3 March 2021

Version 3.10

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2 Bluegiga Bluetooth Dual Mode Software Release Notes

2.1 Bluetooth Dual Mode Software v.1.7.0 build 217

Software Version	1.7.0 build 217
Software Status	Production
Release Date	3rd of March, 2021
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.1.1 Changes: 1.7.0 (build 217) compared to 1.6.0 (build 215)

New Features

Feature	Explanation
Accessory identification information parameters	Updated list of accessory identification information parameters according to new requirements in MFi specification

Quality Improvements

- N/A

Fixed Known Issues in this release

ID	Issue	Explanation
N/A	N/A	No known issues

2.2 Bluetooth Dual Mode Software v.1.6.0 build 215

Software Version	1.6.0 build 215
Software Status	Production
Release Date	25th of November, 2020
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.2.1 Changes: 1.6.0 (build 215) compared to 1.5.0 (build 212)

Quality Improvements

- Implemented protection against IOActive BR/EDR ASB-U Injection Attack
- Implemented protection against Impersonation in the Passkey Entry Protocol, Authentication of the LE Legacy Pairing Protocol and Impersonation in the PIN Pairing Protocol vulnerabilities

Fixed Known Issues in this release

ID	Issue	Explanation of the issue
979	BT121 iAP endpoint_send buffers stuck full	Endpoint was not closed after iAP connection timeout and buffers full message
986	Unable to bond with PC (Win10)	BT121 didn't store the previous link key

ID	Issue	Explanation of the issue
992	Wrong invalidation of a some PS Keys	PS Dump function returned no longer valid PS Keys apart from existing PS Keys

2.3 Bluetooth Dual Mode Software v.1.5.0 build 212

Software Version	1.5.0 build 212
Software Status	Production
Release Date	6th of April, 2020
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.3.1 Changes: 1.5.0 (build 212) compared to 1.4.0 (build 211)

Quality Improvements

- Implemented protection against SweynTooth vulnerabilities

Known Issues in this release

ID	Issue	Explanation
N/A	N/A	No known issues

2.4 Bluetooth Dual Mode Software v.1.4.0 build 211

Software Version	1.4.0 build 211
Software Status	Production
Release Date	20th of March, 2020
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.4.1 Changes: 1.4.0 (build 211) compared to 1.3.0 (build 210)

Quality Improvements

- Changed messages generated during HID connection closing

Fixed Known Issues since the version 1.3.0 build 210

ID	Issue	Explanation of the issue

ID	Issue	Explanation of the issue
981	Problem with smartphone connection over HID profile	When the first connection attempt initialized by BT121 was rejected intentionally by a smartphone user, the next connection attempt resulted with an error message ' PSM already in use '
985	Bonding to BT121 with random static address doesn't work	When BT121 device uses random static address, the attempt of bonding establishment during LE connection fails

2.5 Bluetooth Dual Mode Software v.1.3.0 build 210

Software Version	1.3.0 build 210
Software Status	Production
Release Date	25th of October, 2019
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.5.1 Changes: 1.3.0 (build 210) compared to 1.2.0 (build 208)

New Features

Feature	Explanation
BGAPI and streaming mode switching	Support for switching between BGAPI and streaming mode at runtime
Bridging example	Added LE serial RFCOMM bridging BGScript example
Delay example	Added example of delay realization in BGScript

Quality Improvements

- Improved multiple connections handling
- Added getting the value of the first and the last handlers related to a specific characteristic during discovering process
- Added the number of sent packets to test_dtm_completed event
- Added protection against changing encryption key size in the process of connection establishment and during the connection by introducing minimum key size checking
- Implemented protection against CVE-2019-2102 vulnerability by dropping connection if LTK provided by a remote device is the same as one used in Bluetooth Core Specification example

Fixed Known Issues since the version 1.2.0 build 208

ID	Issue	Explanation of the issue
900	GATT over Bluetooth BR /EDR not work correctly	Writing over Bluetooth BR/EDR a value to the remote attribute residing at a remote GATT server did not work
976	Memory leakage during closing HID connections	When opening/closing connections very frequently using HID, o ne of following errors could have been received: 'Controller is at limit of connections it can support' or 'Device has run out of memory'

ID	Issue	Explanation of the issue
938	Bug in the bgbuild.exe parser	Bgbuild.exe parser was not giving any error with a wrong value type in a gatt.xml file
980	Reset in sleep mode	BT121 occasionally was resetting when using sleep mode

Known Issues in this release

ID	Issue	Explanation
N/A	N/A	No known issues

2.5.2 IOP testing

This software release (1.3.0 build 210) has been tested against the following device platforms. Basic *Bluetooth* BR/EDR and Low Energy connection, pairing and data transfer tests have been run. "OK" means that test was performed with a positive result. "N/A" means the platform does not support the functionality.

Test Case	Android 7.0	Android 8.0	Android 9.0	iOS 12.4	Windows 10	Ubuntu 18.04.03	MacOS 10.13.6
BT BR/EDR connection	OK	OK	OK	OK	OK	OK	OK
BT BR/EDR pairing	OK	OK	OK	OK	OK	OK	OK
SPP or iAP2	OK	OK	OK	OK	OK	OK	OK
BT Low Energy connection	OK	OK	OK	OK	OK	OK	N/A
BT Low Energy pairing	OK	OK	OK	OK	OK	OK	N/A
GATT over BT Low Energy	OK	OK	OK	OK	OK	OK	N/A

Tested Platform	Device / Stack Manufacturer
Android 7.0	Samsung Galaxy Tab S2
Android 8.0	Nokia 8
Android 9.0	Xiaomi Mi A2
iOS 12.4	iPhone 6
Windows 10	CSR8510 A10 Dongle
Ubuntu 18.04.03	BlueZ 5.48 CSR8510 A10 Dongle
MacOS 10.13.6	Apple BT Soft Version 6.0.7f10

2.6 Bluetooth Dual Mode Software v.1.2.0 build 208

Software Version	1.2.0 build 208
Software Status	Production
Release Date	28th of August, 2018
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.6.1 Changes: 1.2.0 (build 208) compared to 1.1.2 (build 184)

New Features

Feature	Explanation
Multiple filtering in scan results	Multiple filtering added to the le_gap_set_scan_result_filter
Encryption option during pairing	New configuration option has been introduced that allows to choose only EncKey during pairing or a combination of EncKey, IdKey and Sign.
Support for Apple iAP authentication co-processor 3.0	Support for the new Apple iAP authentication co-processor 3.0 has been added
Enabling and disabling services	It is possible to enable/disable service during runtime.
Different BT address for LE and BT BR/EDR	It is possible to have different BT and LE address. For LE side a random static address is assigned.
SPI slave	SPI slave implementation has been added

Quality Improvements

- Bluetooth SIG security update Regarding Coordinate Invalid Curve Attack
- Changed the Silicon Labs License Agreement text for SDK and host examples
- Bondable mode can be configured separately for BLE and BR/EDR BT
- Improved API documentation generation
- API descriptions have been updated
- Documentation of using HID descriptor in the module has been updated
- Not saving BR/EDR link_key if MITM required and LinkKey is not MITM protected
- DFU host example handles the possible UART desync at startup
- User interface improvement for BGTool application
- SPI examples have been updated
- DFU examples have been updated
- iAP reference application has been updated
- HW sleep and port options documentation has been updated

Fixed Known Issues since the version 1.1.2 build 184

ID	Issue	Explanation of the issue
888	RTS line remaining stuck active high	RTS line stuck active when sending a large amount of data over RFCOMM link. Timeout has been introduced.

ID	Issue	Explanation of the issue
889	bt_connection_list does not report HID connections	Connection list did not contain HID connections to check the module role (master or slave). List of reported connections has been changed.
892	set_role works only in RFCOMM connections	It was reported that set_role command works only with RFCOMM connection and does not work with HID connections.
894	Strange behavior when opening the ACL and the RFCOMM connections separately	You can open an ACL link with the command bt_gap_open, but you cannot close such ACL link manually, because it is closed automatically any time the last RFCOMM connection is closed. Now, after manually opening an ACL link with the command bt_gap_open, such ACL link will remain up until you explicitly close it with the command endpoint_close (using the connection ID received with the response of the bt_gap_open).
898	Internal temperature sensor issue	Compensation for supply voltage fluctuations when reading the temperature has been added.
903	Investigation needed on a system_recovery event	The event evt_system_recovery is being triggered after a write to a gatt server attribute.
906	LE security manager send wrong Identity Resolving Key	BT121 does not support resolveable addresses so the key that the module sends should be all zeros.
911	Every other attempt to re-program a BT121 with the bgupdate.exe fails with "Sync Failed" message	In some cases during the process of a re-program of the module with the bgupdate.exe, the "Sync Failed" message occurs. 10 ms delays added between writes.
918	BT121 freezes when sending notifications while rts/cts flow control is disabled	BT121 is operating with the host STM32 microcontroller. The connection is up and running and after some random time BT121 stops responding for any commands. The last outgoing command is a dumo_cmd_gatt_server_send_characteristic_notification. The only way to make it work again is to do a power cycle/reset and reinitiate the module.
921	HCI not waking up "watchdog" does not work	Root cause for HCI getting stuck is a controller issue. Disabling the contoroller sleep unless it is put on intentionally.
922	HID Keyboard - system_recovery event comes when module reconnects to Win10	After disconnecting (but paired) and trying to re-connect from the module to the host, a successful response to the bt_hid_open call is received, but then the module resets and issues a system_recovery event. This happens using a Win10 PC as well as a MacOS computer. When using mobile devices (Android and iOS) then the re-connection works as expected.
924	Problem with connection establishment while at the edge of range	When the remote device is at the edge of the range, it is not rare not to receive any event following the commands bt_rfcomm_open or bt_rfcomm_open_port, whereas either the event endpoint_closing with reason 0x0204 (page timeout) or the many events that come when a connection is successfully established are expected. This is a TI radio related issue. Protection timer to gap_open acl for BR/EDR has been added as a workaround.
928	sm_store_bonding_configuration is not persistent across a reset	After boot the default configuration appears to be always in use until the sm_store_bonding_configuration command is issued, despite the sm_read_bonding_configuration reporting a different configuration than the default.
930	le_gap_scan_response events not issued if the "Flags" AD structure is at the end af the adv data	With "Flags" added at the end of AD structure BT121 as the scanner will not report advertisements at all and only scan responses are reported

ID	Issue	Explanation of the issue
931	Cannot advertise in scannable_non_connectable mode while connected	Restarting the advertising mode using scannable_non_connectable mode after a connection is established was not possible.
936	BT121 should continue to retry the iAP initialization byte sequence every second	With iOS 11.2 beta slave, BT121 is sending an iAP initialization byte sequence but only sends it once and never tries again. BT121 should continue to retry the iAP initialization byte sequence every second according to section 47.1.7.2 of the Apple Accessory Interface Specification R27.
946	Pullup function doesn't work	It was impossible to use wakeup_pin with state down, because a pull-up feature attribute in HW config file and corresponing API command did not work properly.
948	Problems with DFU host example in build 206	It was impossible to perform field upgrade with ST-based DFU using example under host_example/dfu direction because of a wrong parameter in data_length in uart_rx function.

Known Issues in this release

ID	Issue	Explanation
N/A	N/A	No known issues

2.6.2 IOP testing

This software release (1.2.0 build 208) has been tested against the following device platforms. Basic *Bluetooth* BR/EDR and Low Energy connection, pairing and data transfer tests have been run. "OK" means that test was performed with a positive result. "N/A" means the platform does not support the functionality.

Test Case	Android 6.0	Android 7.0	Android 8.0	iOS 11.4.1	Windows 10	Ubuntu 18.04.1	MacOS 10.13.6
BT BR/EDR connection	OK	OK	OK	OK	OK	OK	OK
BT BR/EDR pairing	OK	OK	OK	OK	OK	OK	OK
SPP or iAP2	OK	OK	OK	OK	OK	OK	OK
BT Low Energy connection	OK	OK	OK	OK	OK	OK	N/A
BT Low Energy pairing	OK	OK	OK	OK	OK	OK	N/A
GATT over BT Low Energy	OK	OK	OK	OK	OK	OK	N/A

Tested Platform	Device / Stack Manufacturer
Android 6.0	Samsung Galaxy J5
Android 7.0	Samsung Galaxy S6
Android 8.0	Sony Xperia XZ1 Compact
iOS 11.4.1	iPhone 7 Plus
Windows 10	CSR8510 A10 Dongle
Ubuntu 18.04.1	BlueZ 5.48 CSR8510 A10 Dongle
MacOS 10.13.6	Apple BT Soft Version 6.0.7f10

2.7 Bluetooth Dual Mode Software v.1.1.2 build 184

Software Version	1.1.2 build 184
Software Status	Production
Release Date	3rd of March, 2017
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.7.1 Changes: 1.1.2 (build 184) compared to 1.1.1 (build 168)

New Features

Feature	Explanation
evt_bt_rfcomm_credit_starvation event	New event for indicating that the device is running out of RFCOMM credits. As an application level workaround, one can then disconnect and reconnect.
cmd_le_gap_set_scan_result_filter()	Added the ability to filter scan responses and advertisements by device name.
cmd_hardware_read_junction_temperature()	This command can be used to read junction temperature (in Celsius) of the internal MCU when ADC is set active.

Quality Improvements

- Improved API reference manual documentation
- Characteristic length definitions fixed in GATT.xml
- General documentation improvements
- BGTool crash fixed
- HID virtual cable unplug fixed
- Number of bondings now loaded in start-up
- I2C fixes
- Updated BGUpdate tool to handle non-virtual COM ports
- Fixed all examples for better IOP with Windows PCs running Toshiba stack
- RF test mode robustness improved in LE cases
- RFCOMM endpoint data handling in BGScript does not cause a crash anymore
- Fixed SPP server example
- Storing bonding keys for legacy devices only if they do not exist yet
- Improved IOP with WinCE devices by handling <ServiceName> tag better
- Improved HCI controller watchdog
- RFCOMM MTU size is set the same for both directions for better Android IOP

Fixed Known Issues since the version 1.1.1 build 168

ID	Issue	Explanation of the issue
317	Wrong byte order with Android 5.1	Android OS 5.1 release has a bug which causes 128bit UUIDs to be shown in wrong byte order. At least from Android 6.0.1 onward, the byte order is fixed.
428	Advertisement data	This functionality will not be changed in the forthcoming releases anymore, but the user must manually stop advertising to change advertising data if needed.
835	Lost ACL frames	The original TI controller issue will no longer be fixed for the existing HW version of the product. However, there is now an application level workaround for the issue. Please see New Features chapter for the description, and API Reference Manual for more details.

ID	Issue	Explanation of the issue
841	Closing RFCOMM connection	If remote end, in this case a certain type of Windows PC, closes RFCOMM connection too quickly, BT121 will lose the last part of the incoming data, which is sent just before RFCOMM closing. This behavior is not seen for example with Android or iOS devices.
847	Bidirectional iAP UART traffic	If iAP data is sent over UART in both directions exactly at the same time, data transfer can hang. To fix this, iAP data packet and acknowledgement are now separated to different RFCOMM frames.

Known Issues in this release

ID	Issue	Explanation
889	HID connections	cmd_bt_connection_list command does not report HID connections.
892	cmd_bt_connection_set_role()	The command only works for RFCOMM connections.

2.8 Bluetooth Dual Mode Ready Software v.1.1.1 build 168

Software Version	1.1.1 build 168
Software Status	Production
Release Date	25th of October, 2016
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.8.1 Changes: 1.1.1 (build 168) compared to 1.1.0 (build 154)

New Features

Feature	Explanation
bt_sdp_add_entry command	This command can be used to add an SDP record into SDP server.
bt_sdp_delete_entry command	This command can be used to delete an SDP record from SDP server.
hardware_read_write_spi command	Read and write command for SPI interface.
RFCOMM port information	Local RFCOMM port information is added to bt_connection_parameters event as the last parameter.
Maximum number of bondings reduced	In order to free more flash memory for customer applications, we have decided to reduce the size of the database, which holds the information about the bondings. The maximum number of stored bondings is now 12.

Quality Improvements

- Improved API reference manual documentation
- Changes in iOS 10 taken into account in interoperability with Apple devices
- Local and remote user messages fixed when closing an HID connection
- SDK examples improved
- Improvement to ensure Apple ATS tests always pass
- Application Note and other documentation updates
- Improved BGTool with minor and cosmetic fixes
- L2CAP control message ID fixed
- HID UUID now correctly added to EIR when HID server is started
- Firmware CRC checksum calculation fixed
- Endpoint data event fixed for BGScript when using BGAPI at the same time

- HID endpoints are now closed automatically after a timeout if it is not manually closed
- Non-supported SDP configuration options handled gracefully for better interoperability
- Optimized flash usage when storing bondings
- GATT service SDP record made configurable
- Fixed I2C timing calculations

Fixed Known Issues since the version 1.1.0 build 154

ID	Issue	Explanation of the issue
672	Local name encoding	It is possible to set an invalid local name for a device.
816	BGTool's re-connect button	The MAC address used by the BGTool in the bt_rfcomm_open command is broken, when this command is launched by pressing the reconnect button under the RFCOMM tab.
817	UART parity bit	When setting parity bit to odd or even, the parity bit is not added to the 8 data bits but the module starts to use 7 data bits. This prevents the use of parity bit with the BGAPI.
818	SPI read	SPI reads return invalid data.
821	6th incoming SPP connection	6th incoming SPP connection will make the module SW to run out of memory, so it is not recommended to have more than 5 simultaneous SPP connections with the newest SW build. This limitation has emerged due the new features in the FW, and those reserve a little bit more RAM for the system tasks compared to the previous build.

Known Issues in this release

ID	Issue	Explanation
317	Wrong byte order with Android 5.1	Android OS 5.1 release has a bug which causes 128bit UUIDs to be shown in wrong byte order.
428	Advertisement data	It is not possible to change advertising data during advertising without stopping advertising in between.
835	Lost ACL frames	There is an issue in TI controller, which can cause data transfer to hang when in transparent mode. This seems to be because the controller does not always handle SEQN when the ACL frame contains bit errors.
841	Closing RFCOMM connection	If remote end, in this case a certain type of Windows PC, closes RFCOMM connection too quickly, BT121 will lose the last part of the incoming data, which is sent just before RFCOMM closing. This behavior is not seen for example with Android or iOS devices.
847	Bidirectional iAP UART traffic	If iAP data is sent over UART in both directions exactly at the same time, data transfer can hang.

2.9 Bluetooth Dual Mode Software v.1.1.0 build 154

Software Version	1.1.0 build 154
Software Status	Production
Release Date	1st of July, 2016
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.9.1 Changes: 1.1.0 (build 154) compared to 1.0.0 (build 97)

New Features

Feature	Explanation
HID device over BR/EDR	HID profile support.
Cable replacement	Cable replacement functionality for *Bluetooth* Low Energy connections.
bt_connection_get_rssi command	Get the RSSI value of a connection.
bt_connection_read_clock command	Read *Bluetooth* clock of a connection/piconet.
bt_gap_set_auto_sniff command	Set automatic sniff parameters for connections.
bt_gap_set_discovery_mode command	Set the discovery mode.
bt_gap_set_host_channel_classification command	Configure BR/EDR channel classifications.
bt_rfcomm_modem_status command	Set modem control status for RFCOMM connections.
bt_rfcomm_set_modem_status_default command	Set modem control status to default values.
bt_rfcomm_start_server_port command	Start RFCOMM connection on a specific port.
bt_rfcomm_stop_server_port command	Stop RFCOMM connection on a specific port.
endpoint_set_active command	Set an endpoint active / inactive.
endpoint_closed event	Indicates that an RFCOMM endpoint has been closed by a timer.
gatt_set_max_mtu command	Set maximum size of GATT MTU.
hardware_read_vdd command	Read voltage level on VDD pin.
le_connection_list command	List of *Bluetooth* Low Energy current connections and their parameters.
le_gap_set_host_channel_classification command	Configure *Bluetooth* Low Energy channel classifications.
sm_pin_code_request event	Event for requesting the user to enter legacy pairing PIN code.
sm_enter_pin_code command	Command to input the legacy paring PIN code.
system_recovery event	Event indicating an error condition and a following reset.
system_script_stopped event	Event indicating an event handler running more than 1000000 interpreter steps.

Bootloader Change

A new boot-loader has been introduced to free some additional flash memory for the user application. When upgrading the module's Bluetooth software from the previous build 97 using the BGAPI-based DFU method, it is required to take into account that the boot-loader must be updated separately. A host example in C code is provided in the new SDK under the directory **\host_example\dfu** to demonstrate the DFU update procedure. A knowledge-base article also exists with more details about the BGAPI-based DFU update method, and about the other two re-flashing methods. The article can be found here: http://community.silabs.com/t5/Wireless-Knowledge-Base/Programming-the-BT121/ta-p/173579

Quality Improvements

- BGTool stability improved
- Example applications updated
- RFCOMM robustness improved
- Sleep functionality improved for scripting applications
- Fixed *Bluetooth* Low Energy connection counters
- UART state fixed after waking up from CPU stop mode
- Code size optimized to allow more flash memory for customer applications
- Improved data buffer usage to make data streaming more reliable
- Updated TI firmware to fix issues with LE data streaming and *Bluetooth* Low Energy advertising
- Fixed a memory leak in SDP server
- Fixed a memory leak in ATT
- Fixed endpoint streaming issues
- Fixed Security Manager to handle keyboard only devices correctly
- Improved Security Manager robustness
- Improved interoperability with Android and iOS devices
- Multiple GATT notifications are now supported properly
- Fixed ADC configuration
- Fixed ACL buffer handling to allow data routing between two RFCOMM endpoints
- le_gap_set_conn_parameters() and le_connection_set_parameters() now validate the parameters properly
- Fixed slave select pin usage
- Internal buffering improved to save RAM with connections
- Bi-directional data sending fixed to be reliable
- Unused RFCOMM endpoints are automatically closed
- ProductID and VendorID of the Device ID Profile can be set dynamically
- GATT characteristic handle and incoming packet robustness improved
- CoD is now preserved over reset
- System ID characteristic is now properly initialized
- flash_ps_erase() returns a proper error if the key in question does not exist

Fixed Known Issues since the version 1.0.0 build 97

ID	Issue	Explanation of the issue
103	HCI interface memory consumption	HCI interface memory consumption is not optimized.
220	*Bluetooth* stack initialization	Even if *Bluetooth* stack is not yet initialized, GAP does not currently give any error, when sending commands to the stack.
247	RFCOMM connection closing	Connection closed event gives reason code 0x216 "local terminated" even if remote side closes the connection.
288	BGAPI™ message payload limitation	BGAPI™ message payload is limited to 250 bytes.
492	le_gap_set_mode command	Connectable mode setting cannot be changed multiple times in a row without clearing the mode setting first.
507	Non-encrypted LE connection	Characteristic which requires authentication is accessible without encryption with the devices which have been authenticated and bonded.
567	GATT out-of-bounds	There is a possible out of bounds write in GATT DB in case when module has over 64 "dynamic" characteristics and notification or indication is enabled for those characteristics. Same happens if client characteristic configuration is written to characteristic, which is defined as constant.

ID	Issue	Explanation of the issue
583	Multiple RFCOMM connections to the same port	There is no error if one tries to open multiple connections to the same RFCOMM port.
586	bt_connection_list command	bt_connection_list command lists also closed RFCOMM connections.
589	Invalid endpoint parameters	bt_rfcomm_open_* and bt_rfcomm_start_server commands don't report a failure, even if invalid endpoint parameter is given.
592	flash_ps_erase command	flash_ps_erase command returns success even if the key which is being erased doesn't exist.

Known Issues in this release

ID	Issue	Explanation
317	Wrong byte order with Android 5.1	Android OS 5.1 release has a bug which causes 128bit UUIDs to be shown in wrong byte order.
428	Advertisement data	It is not possible to change advertising data during advertising without stopping advertising in between.
672	Local name encoding	It is possible to set an invalid local name for a device.
816	BGTool's re-connect button	The MAC address used by the BGTool in the bt_rfcomm_open command is broken, when this command is launched by pressing the reconnect button under the RFCOMM tab.
817	UART parity bit	When setting parity bit to odd or even, the parity bit is not added to the 8 data bits but the module starts to use 7 data bits. This prevents the use of parity bit with the BGAPI.
818	SPI read	SPI reads return invalid data.
821	6th incoming SPP connection	6th incoming SPP connection will make the module SW to run out of memory, so it is not recommended to have more than 5 simultaneous SPP connections with the newest SW build. This limitation has emerged due the new features in the FW, and those reserve a little bit more RAM for the system tasks compared to the previous build.

2.10 Bluetooth Dual Mode Software v.1.0.0 build 97

Software Version	1.0.0 build 97
Software Status	Production
Release Date	24th of September, 2015
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.10.1 Changes: 1.0.0 (build 97) compared to 0.9.1 (build 44)

New Features

Feature	Explanation
Bluetooth qualification	*Bluetooth* SIG qualification completed, Declaration ID D027374.

Feature	Explanation
Regulatory certifications	Certification completed for FCC, IC and CE.
Country certifications	Certification completed for Japan and South-Korea.
Pairing handling	Implemented default pairing data handling algorithm (overwrite oldest pairing).

Quality Improvements

- All documentation updated after Beta release according to improvements made for the Production release.
- BGTool stability improved.
- Example applications updated.
- Fixed crashing with multiple software timers.
- Fixed ADC initialization and added timeout to initialization phase.
- Fixed ADC error codes.
- Fixed reading of ADC values.
- Fixed disallowing role changes in bt_gap_set_policy command.
- Added status parameter to dumo_evt_bt_gap_remote_name event.
- Fixed crashing in bt_connection_set_* commands.
- Fixed handling of multiple bonding entries to same device, when both BR/EDR and Low Energy are being used.
- Fixed corruption of client characteristic configuration when using multiple custom characteristics.
- Added advertisement parameter checking.
- Enabled alternate settings for I2C in bgbuild.
- Fixed direction flag in bt_connection_parameters event.
- Fixed indicating user correctly if an SDP record is not found.
- Fixed variable length characteristics length calculation.
- TI firmware updated according to TI recommendations to prevent crashing when both ends close the connection at the same time.
- le_gap_end_procedure is not used anymore for canceling connection creation.
- Improved le_gap_open to pass return code.
- Fixed iap_start_server and iap_stop_server failure error codes.
- Fixed outgoing re-connection failure after the other device comes back into range.
- Fixed bt_gap_set_parameters command.
- Fixed handling of old iAP1 iOS devices.
- Included iAP connections in connection listings into BGAPI.
- Fixed crash in connection details.
- Fixed bonding configuration.
- Deleting useless SDP files in SDK after image is created when using bgbuild.
- Fixed random number generator initialization.
- Send bt_connection_parameters for iAP connections also.
- Fixed iAP authentication bug when using AppLaunch.
- Fixed host API types for IAR compiler.
- Unified RF test APIs for BR/EDR and Low Energy.
- Added throughput measurements example application.
- Fixed iAP features listing.
- Removed unused RFCOMM channel parameter (from bt_rfcomm_start_server and iap_start_server commands).
- Implemented iap_stop_server command.
- Implemented bt_rfcomm_stop_server command.
- Fixed the handling of invalid att_data when read_attribute_value command is issued.
- Fixed crashing in read_attribute_type command when invalid att_data is given.
- Fixed bonding data reading for *Bluetooth* Low Energy connections.
- Fixed response being sent before event when using sm_list_all_bondings command.
- Fixed test mode for TI hardware.
- Scheduled flash defragmentation in more optimized way to prevent BGAPI response delays.
- Fixed the handling of multiple incoming iAP packets combined to same RFCOMM packet.
- Implemented sm_set_oob_data command.
- Fixed key sizes in Security Manager.
- Added pairing information integrity checks.

- Implemented le_gap_set_max_power command.
- Fixed the order of the bonding data in sm_list_all_bondings command.
- Added bonding database integrity checking.
- Added syntax error message for wrong BGAPI commands.
- Fixed crash in bidirectional data sending.
- Updated TI firmware to fix issues with pairing.

Fixed Known Issues since the previous Release

ID	Issue	Explanation
246	le_gap_open	le_gap_open command always returns "out of memory" in all error cases.
296	le_gap_end_procedure	le_gap_end_procedure does not always stop le_gap_open procedure.
364	Bonding parameter in scan response	Bonding parameter in evt_gap_scan_response event can sometimes contain wrong information.
365	Bonding with Android	It is sometimes possible to bond with an Android device, even if bonding is disabled.
398	cmd_sm_enter_passkey	cmd_sm_enter_passkey sometimes returns error code 384 even if pairing is successful.
439	Unresponsive BGAPI™	It is sometimes possible over a long period of usage that the API does not respond to new commands.
462	Bonding events	Bonding event is not always received, even if bonding is successful.
466	Pairing information	It is possible that in some cases, pairing information is not properly stored.

Known Issues in this Release

ID	Issue	Explanation
103	HCI interface memory consumption	HCI interface memory consumption is not optimized.
220	*Bluetooth* stack initialization	Even if *Bluetooth* stack is not yet initialized, GAP does not currently give any error, when sending commands to the stack.
247	RFCOMM connection closing	Connection closed event gives reason code 0x216 "local terminated" even if remote side closes the connection.
288	BGAPI™ message payload limitation	BGAPI™ message payload is limited to 250 bytes.
317	Wrong byte order with Android 5.1	Android OS 5.1 release has a bug, which causes 128bit UUIDs to be shown in wrong byte order.
428	Advertisement data	It is not possible to change advertising data during advertising without stopping advertising in between.
492	le_gap_set_mode command	Connectable mode setting cannot be changed multiple times in a row without clearing the mode setting first.
507	Non-encrypted LE connection	Characteristic which requires authentication is accessible without encryption with the devices which have been authenticated and bonded.
567	GATT out of bounds	There is a possible out of bounds write in GATT DB in case when module has over 64 "dynamic" characteristics and notification or indication is enabled for those characteristics. Same happens if client config is written to characteristic, which is defined as const.

ID	Issue	Explanation
583	Multiple RFCOMM connections to the same port	There is no error if one tries to open multiple connections to same the RFCOMM port.
586	bt_connection_list command	bt_connection_list command lists also closed RFCOMM connections.
589	Invalid endpoint parameters	bt_rfcomm_open_* and bt_rfcomm_start_server commands don't report a failure, even if invalid endpoint parameter is given.
592	flash_ps_erase command	flash_ps_erase command returns success even if the key which is being erased doesn't exist.

2.11 Bluetooth Dual Mode Software v.0.9.1 build 44

Software Version	0.9.1 build 44
Software Status	Beta
Release Date	22nd of May, 2015
Affected Products	BT121 *Bluetooth* Dual Mode Module

2.11.1 Features in the First Release

Feature	Explanation
SPP	Serial Port Profile for *Bluetooth* BR/EDR
iAP2	Apple iAP2 protocol for *Bluetooth* BR/EDR (only available for Apple MFI Licensees)
ATT	Attribute Profile for *Bluetooth* Low Energy
GATT	Generic Attribute Profile for *Bluetooth* Low Energy
GATT over BR	Generic Attribute Profile for *Bluetooth* BR/EDR
GAP	Generic Access Profile
BGAPI™	Binary command host API
BGScript™	Scripting language for standalone applications

2.11.2 Fixed Issues

ID	Issue	Explanation
N/A	N/A	First public release

2.11.3 Known Issues in this Release

ID	Issue	Explanation
103	HCI interface memory consumption	HCI interface memory consumption is not optimized yet.
220	*Bluetooth* stack initialization	Even if *Bluetooth* stack is not yet initialized, GAP does not currently give any error, when sending commands to the stack.
246	le_gap_open	le_gap_open command always returns "out of memory" in all error cases.

ID	Issue	Explanation
288	BGAPI™ message payload limitation	BGAPI™ message payload is limited to 250 bytes.
296	le_gap_end_procedure	le_gap_end_procedure does not always send le_gap_open procedure.
317	Wrong byte order with Android 5.1	Android OS 5.1 release has a bug, which causes 128bit UUIDs to be shown in wrong byte order.
364	Bonding parameter in scan response	Bonding parameter in evt_gap_scan_response event can sometimes contain wrong information.
365	Bonding with Android	It is sometimes possible to bond with an Android device, even if bonding is disabled.
398	cmd_sm_enter_passkey	cmd_sm_enter_passkey sometimes returns error code 384 even if pairing is successful.
428	Advertisement data	Currently it is not possible to change advertising data during advertising.
439	Unresponsive BGAPI™	It is sometimes possible over a long period of usage that the API does not respond to new commands.
462	Bonding events	Bonding event is not always received, even if bonding is successful.
466	Pairing information	It is possible that in some cases, pairing information is not properly stored.

2.11.4 IOP Testing

This software release (0.9.1 build 44) has been tested against the following device platforms. Basic *Bluetooth* BR/EDR and Low Energy (where applicable) connection, pairing and data transfer tests have been run. N/A means the platform does not support the functionality.

Test Case	Android	iOS	WinPhone	Ubuntu	OSX	Win7 (MS)	Win7 (BC)	Win8 Pro	Win8.1 Pro
BT BR/EDR connection	OK	OK	OK	OK	OK	OK	OK	OK	OK
BT BR/EDR pairing	OK	OK	OK	OK	OK	OK	OK	OK	OK
SPP or iAP2	OK	OK	OK	OK	OK	OK	OK	OK	OK
BT Low Energy connection	OK	OK	OK	OK	N/A	N/A	OK	N/A	OK
BT Low Energy pairing	OK	OK	OK	OK	N/A	N/A	OK	N/A	OK
GATT over BT Low Energy	OK	OK	OK	OK	N/A	N/A	OK	N/A	OK
GATT over BT BR/EDR	OK*	N/A	N/A	OK	N/A	N/A	N/A	N/A	N/A

*) Please see Known Issues #317.

Tested Platform	Device / Stack Manufacturer
Android 5.1	Google Nexus 5
iOS 8.3	Apple iPod
Windows Phone 8.1	Nokia Lumia 625
Ubuntu 10.04.2	PC / BlueZ 5.30 stack
OSX 10.10.3	Apple MacBook Pro
Windows 7 SP1	PC / Microsoft stack

Tested Platform	Device / Stack Manufacturer
Windows 7 SP1	PC / Broadcom 6.5.1 stack
Windows 8 Pro	PC / Microsoft stack
Windows 8.1 Pro	Microsoft Surface Pro tablet

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