BM83 MSPK2v1.3.5 Release Note

VERSION1.3.5

The following are the attributes of this firmware version for specific system requirements and device settings. This release includes one firmware and is located at the following directory structure.
SPP: IS2083 Turnkey v1.3.1\MSPK2 v1.3.5\Software\IS2083 Image\MSPK2v1.3.5\SPP

Firmware updates:

Items	Version
8051 Image	MSPKv2_1.03.0506_SPP
DSP Image	MSPK2.0_DSP_FW_V1.04.0412
Host MCU	1.6.6

Utility Tool Updates:

Items	Version
Config GUI Tool	1.3.25
isUpdate Tool	3.16
SpkCommandSetTool	206.008
iOS Apps	1.6.4
Android Apps	4.40

Error Resolution

- Fixed issue of BM83 reconnection failure when moving phone back into connection range in attempt period.
- Fix issue of BM83 AFH(Auto Frequency Hopping) failure in line-in concert mode after adding 3rd speaker.
- Fixed issue that sometimes BM83 may not send BLE notifications to phone after disconnecting first phone and connecting to another.
- Fixed issue that BM83 may not connect with a paired device after performing pairing with lots of phones by certain operation.
- Fixed issue of BM83 BLE connection failure with some Android 12/13 devices.
- Fixed issue of BM83 BLE connection failure with remote device using public address when it also has Bluetooth classic paired.

VERSION1.3.4

The following are the attributes of this firmware version for specific system requirements and device settings. This release includes one firmware variants and is located at the following directory structure.
SPP: IS2083 Turnkey v1.2.4\Software\IS2083 Image\MSPK2v1.3.4\SPP

Included a BM83 Getting Started Guide to walk through BM83 collateral, software package usage and general application setup & configuration.

Firmware updates:

Items	Version
8051 Images	MSPKv2_1.03.0406_SPP
DSP Image	MSPK2.0_DSP_FW_V1.04.0410
Host MCU	1.6.6

Utility Tool Updates:

Items	Version
Config GUI Tool	1.3.22
isUpdate Tool	3.14
SpkCommandSetTool	206.009
iOS Apps	1.6.4
Android Apps	4.40

Error Resolution and feature enhancement

- Added ANSSI Bluetooth Core Vulnerabilities fix
- Added I2S volume control option to select **"Hardware"** , **"DSP"** and **"Hybrid"**
- Added a UART command to read latency value during run time
- Added 8/16KHZ support for I2S as Aux-in
- Extended line in latency from 80ms to 160ms in Line In Concert mode
- Provided a settings in Config GUI tool to allow master speaker linkback mobile phone when aux-in is inserted during powerup has been resolved.
- Improved Audio Uart Command Document
- Improved BM83 Config GUI Tool Help Menu & Display
- Modified Config GUI tools so ouput is saved as a text file for config settings comparison.
- Improved isUpdate tools and Config GUI tools so that config setting dumped from BM83 can be loaded into ConfigTool.
- iPhone 6 Plus, Samsung S10e : BT link abnormal disconnect in idle mode has been resolved
- Modified MCU code to request BLE connection parrameter update when transparent service established.
- Added a settings in Config GUI tools to disable line-in audio fade in/out when the volume suddenly transit from low to high
- Resolved the cracking sound issue in HFP with mSBC codec
- iPhone 12 Mini : sound breaking periodically(every 3~4 minute) in concert mode has been resolved
- Added feature to allow I2S input with analog audio output
- Slow BLE response during A2DP playback has been resolved
- Added an embedded file explorer in Android MBA app to display OTA file of default folder. This may avoid any compatibility issues with some 3rd party file manager
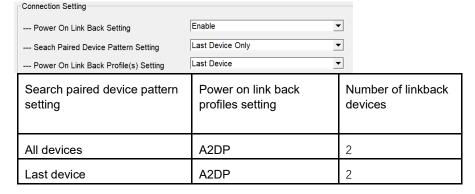- DSP GUI Tools Issue : Enabling Audio effect leads to uncheck MCLK abnormally has been resolved

Behaviour and Limitation

Limitation**:**

Please refer to "**BM83 MSPK2 Design Limitation.pdf**" for the MSPK2 behavior and limitation.The document is located under "Document" folder

Behavior:

The number of linkback device is related to the profiles settings but not the device pattern settings in the config GUI tools:

Search paired device pattern setting	Power on link back profiles setting	Number of linkback devices
All devices	A2DP	2
Last device	A2DP	2

All devices	Last device	1
Last device	Last device	1

VERSION1.3.2

The following are the attributes of this firmware version for specific system requirements and device settings. This release includes three firmware variants and is located at the following directory structure.

SPP: IS2083 Turnkey v1.2.2\Software\IS2083 Image\MSPK2v1.3.2\SPP

GFP: IS2083 Turnkey v1.2.2\Software\IS2083 Image\MSPK2v1.3.2\GFP

PBAP: IS2083 Turnkey v1.2.2\Software\IS2083 Image\MSPK2v1.3.2\PBAP

Details of these variants are discussed in IS2083/BM83 Bluetooth Audio Applications Design Guide.

Firmware updates:

Items	Version
8051 Images	MSPKv2_1.03.0206_GFP MSPKv2_1.03.0206_PBAP MSPKv2_1.03.0206_SPP
DSP Image	MSPK2.0_DSP_FW_V1.04.000A
Host MCU	1.6.5

Utility Tool Updates:

Items	Version
Config GUI Tool	1.3.12
isUpdate Tool	3.02
SpkCommandSetTool	206.003
iOS Apps	1.6.4
Android Apps	4.10

Error Resolution

- BM83 Concert primary resets sometime within 30 min when music is paused has been resolved.
- BM83 Concert mode, audio discontinuity is observed in the presence of microwave oven frequency has been resolved.
- DSP Tool EQ settings doesn't show saved parameters has been resolved
- Unexpected changes in I2S voice output volume and bad voice quality with iPhone has been resolved
- sometimes continuous sound break is observed in Secondary speaker if Concert Primary is connected with Win 10 PC has been resolved
- Audio break issue in concert primary and secondaries has been improved by
    o decreasing MSPK broadcast times if the media buffer is low
    o adding some delay for silence padding when media buffer is empty in Concert Satellite
    o Extending media buffer to 400ms from 340 ms for MSPK SBC

Errata

- Latest update in Android 10 and Android 11 Devices has added more fragments and ierregular transmission of AAC Bluetooth pay load in the presence of WIFI. This result in continuous audio break in Primary and Secondary speakers
➔It is recommended to disable AAC codec in MSPK to overcome this issue with Android Devices.

VERSION1.3.1

The following are the attributes of this firmware version for specific system requirements and device settings. This release includes three firmware variants and is located at the following directory structure.

SPP: IS2083 Turnkey v1.2.1\Software\IS2083 Image\MSPK2v1.3.1\SPP

GFP: IS2083 Turnkey v1.2.1\Software\IS2083 Image\MSPK2v1.3.1\GFP

PBAP: IS2083 Turnkey v1.2.1\Software\IS2083 Image\MSPK2v1.3.1\PBAP

Details of these variants are discussed in IS2083/BM83 Bluetooth Audio Applications Design Guide.

Firmware updates:

Items	Version
8051 Images	MSPKv2_1.03.0106_GFP MSPKv2_1.03.0106_PBAP MSPKv2_1.03.0106_SPP
DSP Image	MSPK2.0_DSP_FW_V1.04.0009
Host MCU	1.6.3

Utility Tool Updates:

Items	Version
Config GUI Tool	1.3.12
isUpdate Tool	3.02
SpkCommandSetTool	206.003
iOS Apps	1.6.4
Android Apps	4.9

New Features and Feature Enhancement

- Added Enabled/Disable link back feature when remote doesn't have link key.

Bug Fixed

- BM83 resets with frequent connect/disconnect in concert mode has been resolved.
- Audio click heard in both primary and secondary in concert mode has been resolved.
- BM83 resets in Concert mode when Primary is in scanning mode and volume is changed on the secondary has been resolved.
- BM83 connection issue with old phone (Bluetooth 2.0) has been resolved.
    - o   A bug was introduced while fixing this issue has also been resolved.
- BM83 OTA DFU issue fixed in Android MBA_v4.09_Android-release.apk.
- Link back failure with some Android phone when the device is deleted/forgotten from the phone has been resolved.
- Unexpected changes in I2S voice output volume results in bad sound quality using mSBC with iPhone has been resolved.
- Sometimes deleting the paired device record from the phone resets BM83 running with GFP firmware has been resolved.
- Sometime pairing fails with Google Pixel4 when device name is changed through MBA app has been resolved.
- Updated Config Tools to fix/add the following issues:
    - o   Customized BLE Advertising name was not saved properly in the file. When the file was reopened, it was only showing only first four letters of the name has been fixed.
    - o   Added an option to enable/disable link back when remote has no link key.
- Work around has been added to resolve P3_2 GPIO not returning to high state some times when power off/on happens quickly.
- Volume synchronization issue in concert mode when a secondary device is added in the group has been resolved.

VERSION1.3

Firmware updates:

Items	Version
8051 Images	MSPKv2_1.03.0008_GFP
	MSPKv2_1.03.0008_PBAP
	MSPKv2_1.03.0008_SPP
DSP Image	MSPK2.0_DSP_FW_V1.04.0006
Host MCU	1.6.3

Utility Tool Updates:

Items	Version
Config GUI Tool	1.3.08
isUpdate Tool	3.02
SpkCommandSetTool	206.003
iOS Apps	1.6.4
Android Apps	4.8

New Features and Feature Enhancement

- A2DP audio mixed with one of the following input : Aux-in/I2S/Microphone.
  New MMI action (0x80/0x81) commands control the mixer. Config Tool provide option for this feature.
- Microphone input as Line-in input to Concert master.
- New mechanism in Concert mode endless grouping to interleave between general access code (for new slave) and dedicated access code (for paired slave). New UART command (0x4B) control the endless grouping. Config Tool provide option for this feature.
- Fully support AVC vendor dependent 0x0B(0x4A) command and 0x1A(0x5D) event for AVC vendor dependent command / response.
- Enchance UART command 0x08 to provide project target version.
- Improved OTA/UART DFU flash validation performance
- Enhanced LDAC audio quality by reducing quantization noise floor and harmonic distortion
- Provided BT CoD setting in configuration tools
- MCLK can be enabled under I2S slave.
- 32 bytes vendor data can be stored in flash by Config GUI tools. Uart command (0x31 / 0x13) can retrieve/update the stored data.

Bug Fixed

- Ringtone volume with external codec in embedded mode
- Sometimes not able to increase/decrease volume from 2nd Concert Slave device.
- Firmware do not respond 0x4A uart command after many tries.
- Concert Slave standalone did not trigger auto power off after concert master auto power off.
- No audio output under embedded mode with "power on directly" enabled.
- Paired device list is not updated correctly after 9th device is paired.
- Embedded battery mode cannot auto power off with initial voltage below 3V
- Missing battery UART event and cannot auto power off mode under low power mode.
- Concert mode AAC cannot be used if A2DP do not support AAC.
- Sometime DSP reconfiguration of BCLK for different sampling rate, results in I2S left channel audio silence
- Isupdate v2.97 tool doesn't upgrade firmware through USB.

Errata

- Concert master seldomly cannot link back to iPhone SE (iOS 13.5) once it form concert group.
  ➔ It can be recovered when trigger BT reconnection again.

VERSION1.2

The following are the attributes of this firmware version for specific system requirements and device settings. This release include 3 firmware variants and located at the following directory structure.

SPP: IS2083 Turnkey v1.1.0\Software\IS2083 Image\MSPK2v1.2\SPP

GFP: IS2083 Turnkey v1.1.0\Software\IS2083 Image\MSPK2v1.2\GFP

PBAP: IS2083 Turnkey v1.1.0\Software\IS2083 Image\MSPK2v1.2\PBAP

Details of these variants are discussed in BM83 application user guide.

New Features and Feature Enhancement

- Bluetooth Spec security vulnerability resolution
    - SWEYNTOOTH BLE vulnerabilities issues
    - BIAS(Bluetooth Impersonation Attacks) vulnerability issue(CERT/CC VU#647177)
    - Key Negotiation of Bluetooth(KNOB) BR/EDR Vulnerability(CERT VU#918987)
- Added New UART commands
    - Host MCU DFU UART Command Sets
    - AVRCP Vendor Dependent Command Sets
    - New parameter type to Read BTM Version which include BTM FW version and DSP version details
    - Battery Level Indication to support feature in Report Read Feature List Reply event
    - Enable Device Into Test Mode (EDUTM) command.
    - Re-introduced UART command to control GPIO
- New Configuration Parameters
    - Enable AVRCP Browsing Feature (default Enable)
    - Allow Users to Enable Device Under Test (default Disable)
    - Auto Role Switch to BT Master (default Enable)
    - Enable Role Switch in Link Policy (default Disable)
    - Force As Bluetooth Slave Role (default Disable)
    - Save MSPK Role When Connected (default Disable)
    - MSPK Power Saving Grouping Interval
    - Enable Concert Mode Master SPK Endless Grouping (default Disable)
    - Allow Voice Prompt in MSPK Slave (default Disable)
- Config Tool improvement
    - Drop down target selection(MSPK/GFP/PBAP/AT). Config tool will allow available configuration parameters to be customized.
    - User data manipulation feature provided
- DFU process enhancement
- MBA App
    - DSP OTA tuning scheme
- LDAC Codec Enhancement
    - Passed with latest Sony LDAC conformance certification spec
    - Extend media buffer to 32K Byte to meet Sony recommendation of Blueotth high audio quality design

PBAP

- Created PBAP image and added in the release
- Resolved PABP connection issue

Google Fast Pair

- Created GFP and added in the release
- Compatible with existing MBA mobile App feature
- Include Google Fast Pair option into application layer general pairing procedure.
- New Configuration Parameters
    - Google Fast Pair (default Enable)
    - Google Fast Pair Model ID
    - Google Fast Pair Private Key
    - Google Fast Pair TX Power
    - Battery Notification (default Disable)

Error Resolution

- Audio Issue fix
  - o EQ parameter setting timing error results in EQ mode ineffective
  - o Audio break issues under WCT or/and general A2DP mode corner cases resolved
  - o WCT volume sync under MCU mode error.
  - o Disabling MCLK, disable signal at MCLK1 pin
- Tone/ Voice Prompt issues fixed
  - o Tone play abnormal with line-in enable while powering off
  - o Maximum volume causes voice prompt and sine tone disappear
  - o Tone playing abnormal with BLE link exists
- Bluetooth connectivity issue fixed
  - o Revised profiles/ACL disconnection handling to avoid state machine transition incorrect
  - o Bluetooth stack and profile defects result in profiles connection failure
  - o SCO link handling incorrect make voice dial and voice transfer abnormal.

- Application behavior enhancement
  - o Revise power down flow. Delay PMU power down after power off DSP to avoid AMP pop noise.
  - o Revise MFB button detection for power on pairing flow
  - o Revise report battery level flow
  - o Revise audio source switching flow between A2DP and line-in result in incorrect source reported
  - o Revise CV mode charging flow to make charging curve lower down smoothly as expected.
  - o Memory leak in A2DP connection

Errata
- I2S should be configured as I2S Master for both master and slave speakers when BM83 Concert speakers configured as I2S out. I2S slave is not recommended as Audio discontinuity and unsync between master and slave speakers are observed when configured as I2S slave. There is no restriction on I2S (Master/Slave) in single speaker case.
- BM83 will try to be Bluetooth Slave role during LDAC playback:
  - ⇨ Some mobiles (e. g. Samsung S8) do not receive ACK properly BM83 is Bluetooth Master role during LDAC playback. It will cause audio break because of lower throughput. To have better performance in this circumstance, BM83 will try to be Slave role once LDAC codec is selected.
- Only support max to 2 A2DP links while A2DP LDAC decode playback:
  - ⇨ Because of above, while second ACL link was created, it would become a scatternet toplolgy. Under this scenario, only 2 A2DP links can be served.
- Coexistence of BLE and SCO link in OTA DSP tuning:
  - ⇨ While performing "Voice" OTA DSP tuning via BLE, SCO link is created for transmitting/receiving SCO voice and the voice waveform was captured to measure DSP parameter effect. We suggest customers do not perform tuning and transmit/receive SCO voice simultaneously if BLE master and SCO receiver are not in the same device. Otherwise, BLE disconnection might be observed.
- One shot audio break occurred while using Android Phone playing A2DP music and trigger BLE connection.
  - ⇨ We observed Android phone will change Bluetooth Low Energy Connection Interval as 7.5 ms to query GATT Service Table. It will cause audio break because of lower throughput of A2DP streaming.
- A2DP / Aux-in source switch in A2DP suppress Aux-in case
  - ⇨ While configured to A2DP has higher priority than line-in, switching audio source to line-in from A2DP by MBA could not make line-in music play immediately. This is because most phone will transmit silence A2DP music after paused A2DP. Due to configured to A2DP has higher priority than line-in, the silence music is still decoding but unable heard, this make line-in music delay to play until A2DP silence music is really terminated. The delay time is various by different phone brand. Sometimes it could be lonest to more than 10 seconds.
- iPhone do not display battery level icon for Bluetooth accessory
  - ⇨ We observed iPhone do not display battery level if CoD (Class of Deive) of BM83 is 0x240414 (for minor device class is 0x14 Loudspeaker). But iPhone would display battery level if CoD of BM83 was setting to 0x240404 (for minor device class is 0x04 Wearable Headset Device).

VERSION1.0

The following are the attributes of this firmware version for specific system requirements and device settings

- OTA DFU feature enabled using MBA app(Android & iOS)
- LDAC support enabled
- MCLK can be enabled/disabled in Config Tool
- PBAP 1.2 enabled
- Digital microphone support is enabled
- AAC codec support added for MSPK
- AVRCP browsing feature enabled
- DSP OTA tuning enabled
- Software Development Kit(SDK) enabled
- SPKCommandsetTool crashing issue fixed
- BLE disconnection issue with Samsung S10E resolved
- Connection issue after connection is rejected is resolved
- Fixed BLE and Bluetooth classic disconnect when phone call is disconnected
- SW I2C driver Added

1.   Document Revision History

Revision	Date	Section	Description
1	4/19/2019	Document	Initial Revision
1.1	06/30/2019	V1.0	Added v1.0 release details
1.2	05/08/2020	V1.2	Added v1.2 release details
1.3	8/28/2020	V1.3	Added V1.3 release details
1.3.1	12/15/2020	V1.3.1	Added V1.3.1 release details
1.3.2	1/29/2021	V1.3.2	Added V1.3.2 release details
1.3.4	7/15/2021	V1.3.4	Added V1.3.4 release details

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