BM83 Getting Started Guide

Contents

1. INTRODUCTION

BM83 offered multiple collateral to support different application scenario. The product page provides datasheets, software variants , PC tools and a set of documentation to help user to apply BM83 in their product.

This document provides general introduction of each collateral so users can easily get their needs for their applications. Also, this document will provide some guideline to have a quick start and basic idea to start with BM83.

2. HISTROY

Release Version	Date	Changes	Remark
1.0	June,2021	Initial Release	Go through BM83 collateral Provide shortcut for Application setup details
1.1	Nov,2023	Various update for IS2083 Turnkey_1.3.1 release.	Same as above

3. COLLATERAL OVERVIEW

BM83 documents and Turnkey software package can be downloaded through BM83 / IS2083 website. BM83 EVB samples and information can be obtained through BM83 EVB website. The SDK package can be obtained through your local ESE / FAE.

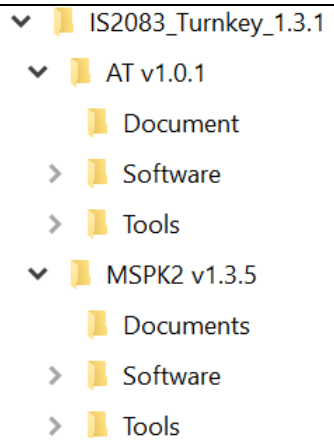
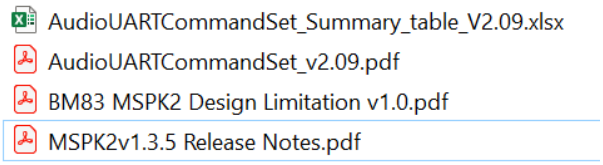
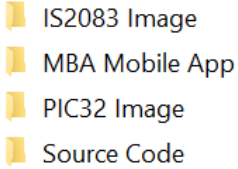
3.1 Collateral in BM83 / IS2083 Website

Items	Name and link	Coverage
Datasheets	BM83 Bluetooth Stereo Audio Module Data Sheet	Module information
	IS2083 Bluetooth Stereo Audio SoC Data Sheet	IC information
User Guide or Application note	IS2083/BM83 Bluetooth Applications Design Guide	General BM83 applications and feature's configuration
	IS2083/BM83 Battery Charger Application Note	IS2083/BM83 internal battery charger applications and configuration
Turnkey Software Package	IS2083 Turnkey Software and Tools v1.3.1	Contains MSPK2 v1.3.5 release and AT 1.0.1 release, and MBA mobile app, PIC32 hex, PIC32 source code, tools and documents.
Software Release Notes	In Turnkey Software Package: \IS2083_Turnkey_1.3.1\MSPK2 v1.3.5\Documents	Multi-speaker firmware release notes v1.3.5
	In Turnkey Software Package: \IS2083_Turnkey_1.3.1\AT v1.0.1\Document	Audio Transceiver firmware release notes v1.0.1
Host MCU firmware development guide	BM83 Host MCU Firmware Development Guide	Required harmony setup, software architecture and the required UART communication protocol
Chip Down Reference Design	IS2083 Chip Down Reference Design Package	Contains IS2083 chip down design files, MP tools and ISRT tools
Reference schematic	BM83 Embedded Mode Reference Circuit	Same as the name
Certifications	BM83SM Regulatory Approval Documentation	
	BM83 BTQF Certification	

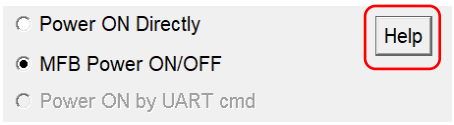
3.2 Collateral in BM83 EVB website

Items	Name and link	Coverage
User Guide or Application note	BM83 Bluetooth Audio Development Board User Guide	EVB configuration and usage Firmware update
	BM83 J-Link 6-Pin Adapter Board	Same as the name
	BM83 Digital Microphone Daughter Board	
	BM83 Evaluation Board	
	BM83 Carrier Board	
Test Report	BM83 EVB EMC Test Report	

3.3 Collateral in Turnkey Software Package

Folder	Sub-folder or items	Usage
Root\		• Contains AT v1.0.1 and MSPK2 v1.3.5 two packages • Each package contains same sub-folder as Software, Document and Tools.
Root\	BM83 Getting Started Guide.pdf	• This document
Root\MSPK2 v1.3.5\Document		1. It is a summary table to list down the supported UART command of different BT audio FW. Users need to check which UART command BM83 is supporting. 2. It is a complete UART command set of all BT audio product. 3. It is document about BM83 design limitations. 4. Package release notes
Root\MSPK2 v1.3.5Software		1. Contains IS2083 images 2. Contains MBA image 3. Contains PIC32 image 4. Contains MBA and PIC32 source code

Root\MSPK2 v1.3.5\Tools	Config Tool isUpdate Tool SPKCommandSetTool	1. Config Tool is a PC tools to configure BM83 software features and settings. 2. isUpdate tool is a PC tools to program BM83 image. 3. SPKCommandSetTool is a PC tool to evaluate UART command
Root\ MSPK2 v1.3.5\Software \IS2083 Image	IS2083 Image MSPK2v1.3.5 SPP Embedded Mode Host Mode	• In MSPK2v1.3.x, only SPP image is provided. • Provided both “Embedded Mode” and “Host Mode” two configurations.
Root\ MSPK2 v1.3.5\Software\IS2083 Image\MSPK2v1.3.5\SPP\ Embedded Mode	Full Image IS208x_UI_1.3.25_Demo_Package_Embedded_Mode_SPP_04102023.hex MSPK2.0_DSP_FW_V1.04.0412.HEX MSPKv2_1.03.0506_SPP_20230911.hex	1. Hex file in Full Image is merged from below 3 files. 2. IS208x_UI_1.3.25_Demo_Package_ Embedded_Mode_SPP_04102023.hex : BM83 configuration settings 3. MSPK2.0_DSP_FW_V1.04.0412.HEX: BM83 DSP FW 4. MSPKv2_1.03.0506_SPP_20230911.hex: BM83 8051 FW ➢ Please follow the “Section 3 – Device Firmware Update” example 2 in “isUpdate Tool User's Guide” to download the images to BM83 EVB.
Root\ MSPK2 v1.3.5\Software\IS2083 Image\MSPK2v1.3.5\SPP\ Host Mode	Full Image IS208x_UI_1.3.25_Demo_Package_MCU_Mode_SPP_04102023.hex MSPK2.0_DSP_FW_V1.04.0412.HEX MSPKv2_1.03.0506_SPP_20230911.hex	1. Hex file in Full Image is merged from below 3 files. 2. IS208x_UI_1.3.25_Demo_Package_ MCU_Mode_SPP_04102023: BM83 configuration settings 3. MSPK2.0_DSP_FW_V1.04.0412.HEX: BM83 DSP FW 4. MSPKv2_1.03.0506_SPP_20230911.hex: BM83 8051 FW Please follow the “Section 3 – Device Firmware Update” example 2 in “isUpdate Tool User's Guide” to download the images to BM83 EVB.
Root\ MSPK2 v1.3.5\Software\MBA Mobile App	MBA_v1.6.4.ipa MBA_v4.40_Android-release.apk	Contains 2 images: 1. iOS MBA : MBA_xxx.ipa 2. Android MBA : MBA_xxx_Android-release.apk
Root\ MSPK2 v1.3.5\Software\PIC32 Image\	Bluetooth_Basic_Demo_BM83_EVB.X.MSPK2 v1.3.4.hex	Contains PIC32 images to demo Host mode. Users need to download the PIC32 image to BM83 EVB.

		➢ Please follow the "Appendix E - Updating PIC32 MCU Parameters" in EVB User Guide to download PIC32 image to BM83 EVB.
Root\ MSPK2 v1.3.5\Software\Source Code	Mobile App PIC32 MCU.zip	Contains 2 source code: 1. Mobile App : Contains both Android and iOS source code. 2. PIC32 MCU : Contains PIC32 source code.
Root\ MSPK2 v1.3.5\Tools\Config Tool	IS208x_Config_GUI_Tool_v1.3.25.zip	1. Extract the zip file, please open "IS208x_Config_GUI_Tool xxx.exe" to start the tools. 2. Do not open "IS208x_DSP_GUI_Tool.exe" directly as it will be invoked by the GUI tool. 3. Each feature will provide a "Help" button. for settings instruction. 
Root\ MSPK2 v1.3.5\Tools\isUpdate Tool	isupdate_v316.zip	1. Extract the zip file, please open "isUpdate.exe" to start the tools 2. Please refer to the user guide for the usage
Root\ MSPK2 v1.3.5\Tools\ SPKCommandSetTool	isbtshstest.log SimpleIO-UM.dll SPKCommandSetTool 206.008.exe	1. Please open "SPKComamndSetTool xxx.exe" to start the tools. 2. "isBtShstest.log" will record the UART command transition

4. SOFTWARE PACKAGE USAGE

4.1.1 Individual Package Release

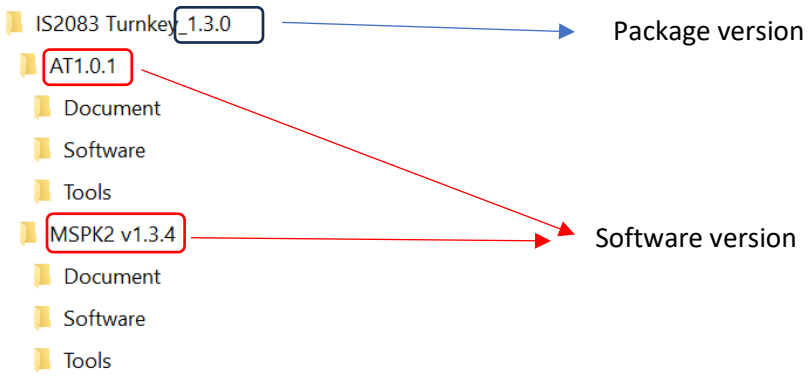
There are Turnkey and SDK software package which contains a set of firmware files and tools. Each software package was verified by internal software quality assurance (SQA) before releasing. User should only stick-on specific software package but not mix up files from different software package. Also, user should use the tools (MBA, PIC32 MCU firmware, PC tools) from the same software package. Otherwise, there may be an unexpected issue which cannot be easily identified.

4.1.2 Release Notes

The release notes for each release list out the updates increment including new features, enhancement, and bug fix and errata.

4.1.3 Package and Software Version

There are package release version and software release version which is not related. The package can contain both MSPKv2 and AT software package, and each software package has their own software version. Each software package contains their relative software image, document, and Tools.

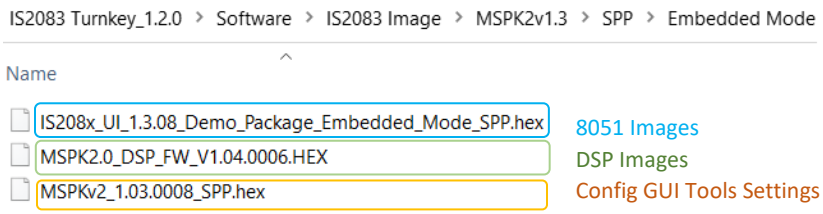


4.1.4 Multi-Speaker (MSPK2) and Audio Transmitter (AT) package

Multi-Speaker as named MSPK2 is software for multi-speaker application, which furtherly refers to concert mode and stereo mode two kinds of application. Audio Transmitter as named AT is audio transmitter application. Latest MSPK2 package is v1.3.5, latest AT package is v1.0.1.

4.1.5 8051 Image, DSP Image and Config GUI Settings

Each of the software build includes three images: 8051, DSP image and Config GUI settings. User should load all these images for the startup evaluation. After that, user may load one of the images for their purpose.



MSPK2 v1.3 SPP Embedded Mode Images Folder

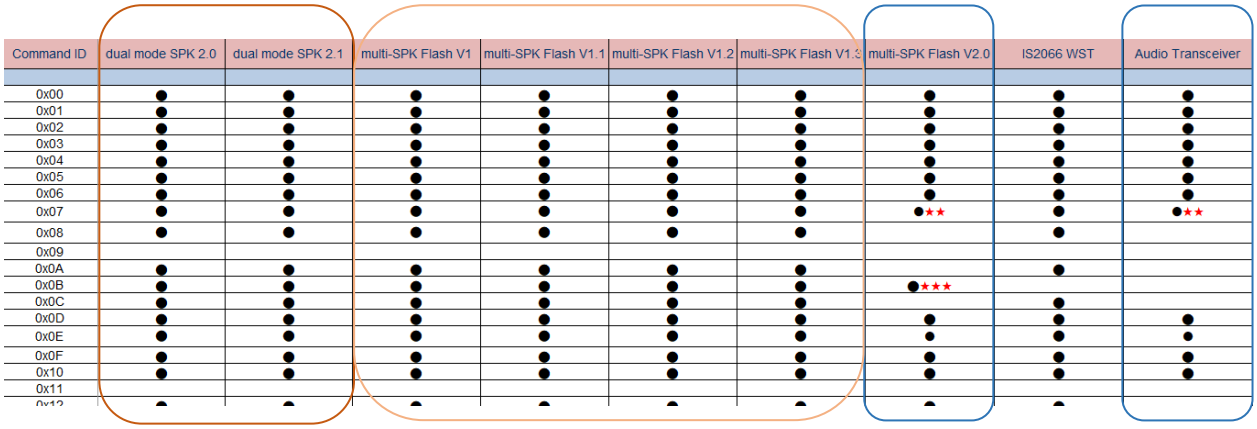
SDK customer can modify the source code to build their 8051 images. No DSP SDK provided. User can modify the Config GUI settings through the Config GUI Tools shared in tools folder. Please refer to here for images downloading.

4.1.6 Uart Commands Usage

The document "AudioUARTCommandSet" and "AudioUARTCommandSet_Summary_table" describe BM83 UART command sets.

The "AudioUARTCommandSet" list down ALL UART commands supported in MCHP Bluetooth audio product including BM20, BM62, BM64 and BM83.

The “AudioUARTCommandSet_Summary_table” shows the available command set of each of Bluetooth audio firmware including MSPK2 and AT 1.0. Please refer to the following table to find the supported UART commands.



Command ID	dual mode SPK 2.0	dual mode SPK 2.1	multi-SPK Flash V1	multi-SPK Flash V1.1	multi-SPK Flash V1.2	multi-SPK Flash V1.3	multi-SPK Flash V2.0	IS2066 WST	Audio Transceiver
0x00	●	●	●	●	●	●	●	●	●
0x01	●	●	●	●	●	●	●	●	●
0x02	●	●	●	●	●	●	●	●	●
0x03	●	●	●	●	●	●	●	●	●
0x04	●	●	●	●	●	●	●	●	●
0x05	●	●	●	●	●	●	●	●	●
0x06	●	●	●	●	●	●	●	●	●
0x07	●	●	●	●	●	●	●★★	●	●★★
0x08	●	●	●	●	●	●		●	
0x09									
0x0A	●	●	●	●	●	●		●	
0x0B	●	●	●	●	●	●	●★★★		
0x0C	●	●	●	●	●	●		●	
0x0D	●	●	●	●	●	●	●	●	●
0x0E	●	●	●	●	●	●	●	●	●
0x0F	●	●	●	●	●	●	●	●	●
0x10	●	●	●	●	●	●	●	●	●
0x11									
0x12	●	●	●	●	●	●	●	●	

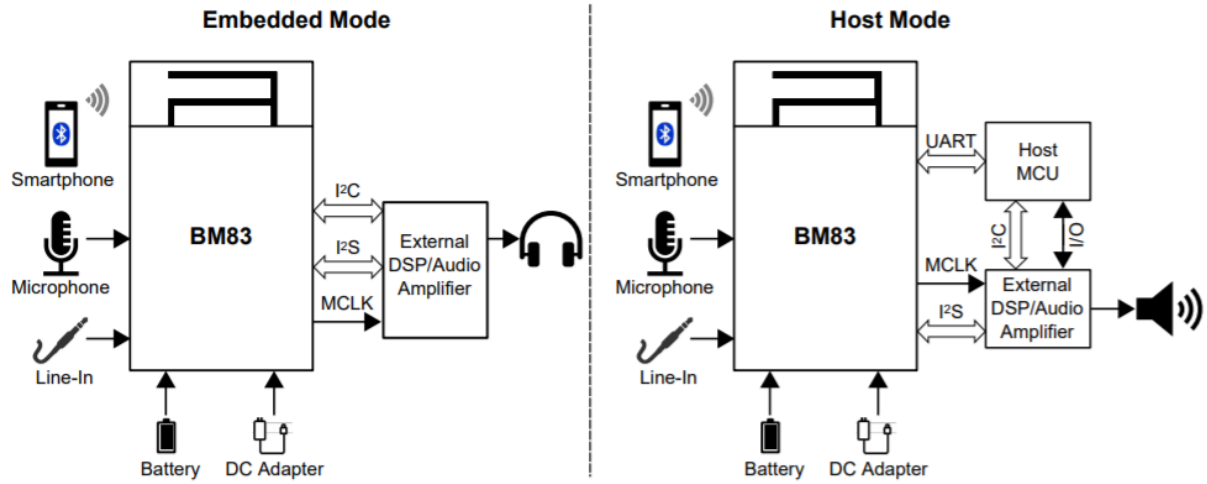
BM62/64 DSPK2.x

BM62/BM64 MSPK 1.x

BM83 MSPK2 v1.x

BM83 AT1.0

5. EMBEDDED / HOST MODE AND FIRMWARE UPDATE



BM83 can work as standalone (Embedded mode) or control by external Host MCU (Host mode). Users need to decide which mode they are looking for.

BM83 EVB support both Embedded mode and Host mode operation. Please refer to Appendix F for Host mode setup and Appendix G for Embedded mode setup in EVB user guide respectively.

In Embedded mode, user need to flash Embedded image files to BM83, please refer to Turnkey BM83 Embedded images. In Host mode, user need to flash Host image files to BM83, please refer to Turnkey BM83 Embedded images. Also, user need to flash PIC32 image to BM83 EVB, please refer to Turnkey BM83 PIC32 image.

6. APPLICATIONS SETUP AND CONFIGURATION

6.1.1 Standalone Music Playback Setup

This is the simple setup to stream a music from mobile phone to BM83. Please refer to the "Host MCU Mode Quick Demo" (section 12.1) of "BM83 Bluetooth Audio Development Board User's Guide"

6.1.2 Concert Mode and Stereo Mode Music Playback

With MSPK2 v1.x firmware, BM83 can support Concert Mode and Stereo mode music playback. With MBA BLE, user can setup the speaker through MBA user interface. Please refer to section 2.2 "MSPK Demo Setup" of the IS2083/BM83 Bluetooth Applications Design Guide for details.

6.1.3 Audio Transmitter Setup

With AT1.0 firmware, BM83 can support A2DP source and A2DP sink at different time. User can setup through SPKCommandSet tool or PIC32 MCU code. Please refer to section 3.2 "AT Demo Setup" of the IS2083/BM83 Bluetooth Applications Design Guide for details.

6.1.4 Google Fast Pairing Setup

With MSPK2 v1.x firmware, BM83 can support Google Fast Pairing to discover and pair nearby Bluetooth devices without using significant phone battery and requiring minimal user interaction. Please refer to section 4.1 “BM83 Google Fast Pair Demo Setup” of the IS2083/BM83 Bluetooth Applications Design Guide for details.

Note: Google Fast Pairing (GFP) image is dropped in software package MSPK2v1.3.x.

6.1.5 OTA DFU

With MSPK2 v1.x firmware or AT1.0, BM83 can support OTA DFU with Microchip Bluetooth Audio Apps (MBA). The appendix L “DFU- OVER-THE-AIR UPGRADE PROCEDURE” of the IS2083/BM83 Bluetooth Applications Design Guide outline to generate an OTA image using isUpdate tool and the OTA process using Android / iOS MBA.