

BM63 Evaluation Board (EVB) User's Guide

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BM63 EVB USER'S GUIDE

Object of Declaration BM63 Evaluation Board

Manufacturer: Microchip Technology Inc. 2355 W. Chandler Blvd. Chandler, Arizona, 85224-6199 USA

This declaration of conformity is issued by the manufacturer.

The development/evaluation tool is designed to be used for research and development in a laboratory environment. This development/evaluation tool is not a Finished Appliance, nor is it intended for incorporation into Finished Appliances that are made commercially available as single functional units to end users under EU EMC Directive 2004/108/EC and as supported by the European Commission's Guide for the EMC Directive 2004/108/EC (8th February 2010).

This development/evaluation tool complies with EU RoHS2 Directive 2011/65/EU.

This development/evaluation tool, when incorporating wireless and radio-telecom functionality, is in compliance with the essential requirement and other relevant provisions of the R&TTE Directive 1999/5/EC and the FCC rules as stated in the declaration of conformity provided in the module datasheet and the module product page available at www.microchip.com.

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Signed for and on behalf of Microchip Technology Inc. at Chandler, Arizona, USA

(Carlon Derek Carlson

12-Sep-14 Date

Advance Information

NOTES:



BM63 EVB USER'S GUIDE

Table of Contents

Chapter 1. Introduction	
1.1 Kit Contents	13
1.2 BM63 EVB Features	15
Chapter 2. Hardware	
2.1 Hardware Features	17
Chapter 3. Getting Started	
3.1 Requirements	23
3.2 Getting Started with BM63 EVB	24
3.3 Application Demonstration	25
3.4 Configuring BM63 Module	
3.5 Updating EEPROM Parameters	
3.6 Updating Flash Code	
3.7 Updating MCU Parameters	
Appendix A. Schematics	
A.1 Reference Schematics	61

NOTES:



BM63 EVB USER'S GUIDE

Preface

NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our web site (www.microchip.com) to obtain the latest documentation available.

Documents are identified with a "DS" number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is "DSXXXXXXA", where "XXXXXXX" is the document number and "A" is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB[®] X IDE online help. Select the Help menu, and then Topics to open a list of available online help files.

INTRODUCTION

This chapter contains general information that will be useful to know before using the BM63 Evaluation Board (EVB). Items discussed in this chapter include:

- Document Layout
- Conventions Used in this Guide
- Recommended Reading
- The Microchip Web Site
- Development Systems Customer Change Notification Service
- Customer Support
- Document Revision History

DOCUMENT LAYOUT

This document describes how to use the BM63 EVB, as a development tool to emulate and debug firmware on a target board. This user's guide is composed of the following chapters:

- Chapter 1. "Introduction" provides an overview of the BM63 EVB and its features.
- Chapter 2. "Hardware" provides hardware details of the BM63 EVB.
- Chapter 3. "Getting Started" provides information about how to establish a Bluetooth[®] connection using the BM63 EVB and how to configure the BM63 module by using various tools.
- Appendix A. "Schematics" provides the BM63 EVB reference schematics.

CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION CONVENTIONS

Description	Represents	Examples
Italic characters	Referenced books	MPLAB IDE User's Guide
	Emphasized text	is the only compiler
Initial caps	A window	the Output window
	A dialog	the Settings dialog
	A menu selection	select Enable Programmer
Quotes	A field name in a window or dialog	"Save project before build"
Underlined, italic text with right angle bracket	A menu path	<u>File > Save</u>
Bold characters	A dialog button	Click OK
	A tab	Click the Power tab
Text in angle brackets < >	A key on the keyboard	Press <enter>, <f1></f1></enter>
Plain Courier New	Sample source code	#define START
	Filenames	autoexec.bat
	File paths	c:\mcc18\h
	Keywords	_asm, _endasm, static
	Command-line options	-0pa+, -0pa-
	Bit values	0, 1
	Constants	0xff, `A'
Italic Courier New	A variable argument	<pre>file.o, where file can be any valid filename</pre>
Square brackets []	Optional arguments	mcc18 [options] <i>file</i> [options]
Curly brackets and pipe character: { }	Choice of mutually exclusive arguments; an OR selection	errorlevel {0 1}
Ellipses	Replaces repeated text	<pre>var_name [, var_name]</pre>
	Represents code supplied by user	<pre>void main (void) { }</pre>
Notes	A Note presents information that we want to re-emphasize, either to help you avoid a common pitfall or to make you aware of operating differences between some device family members. A Note can be in a box, or when used in a table or figure, it is located at the bottom of the table or figure.	Note: This is a standard note box. CAUTION This is a caution note. Note 1: This is a note used in a table.

RECOMMENDED READING

This user's guide describes how to use the BM63 EVB. The following Microchip document is available and recommended as supplemental reference resources.

BM63 Data Sheet (DS60001431)

Refer to this document for a detailed information on the BM63 module. Reference information found in this data sheet includes:

- · Features and pin configurations
- Electrical Specifications
- Reference Circuits

THE MICROCHIP WEB SITE

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The Development Systems product group categories are:

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- Emulators The latest information on the Microchip in-circuit emulator, MPLAB REAL ICE™
- In-Circuit Debuggers The latest information on the Microchip in-circuit debugger, MPLAB ICD 3
- MPLAB X IDE The latest information on Microchip MPLAB X IDE, the Windows[®] Integrated Development Environment for development systems tools
- **Programmers** The latest information on Microchip programmers including the PICkit[™] 3 development programmer

CUSTOMER SUPPORT

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- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or Field Application Engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

Technical support is available through the web site at: http://support.microchip.com.

DOCUMENT REVISION HISTORY

Revision A (July 2016)

This is the initial released version of this document.

NOTES:



BM63 EVB USER'S GUIDE

Chapter 1. Introduction

Thank you for purchasing a Microchip Technology BM63 Evaluation Board (EVB). This document provides a detailed information about the BM63 EVB.

The BM63 EVB enables the user to evaluate and demonstrate the functionality of the BM63 module. The BM63 EVB includes status LEDs and an integrated configuration and programming interface for plug-and-play capability, which enable rapid prototyping and faster time to market.

Along with the BM63 EVB, software tools and applications are provided to demonstrate the Bluetooth connections to the on-board BM63 module with options to configure or program it.

This chapter includes the following topics:

1.1 "Kit Contents"

1.2 "BM63 EVB Features"

1.1 KIT CONTENTS

The BM63 EVB kit contains the following items, as illustrated in Figure 1-1.

- One BM63 EVB, which contains the BM63SPKA1MC2 module
- One micro-USB cable
- One 15V DC power adapter
- Two speaker cables



FIGURE 1-1: BM63 EVB KIT CONTENTS

Note: If you are missing any part of the BM63 EVB kit, contact a Microchip sales office for assistance. A list of Microchip offices for sales and service is provided on the back page of this document.

1.2 BM63 EVB FEATURES

The following are key features of the BM63 EVB:

- The BM63 EVB includes a BM63 module, qualified for Bluetooth 4.2 specifications
- On-board MCU (PIC18F85J10) and DSP (YDA174) for easy operation and feature demonstration
- On-board keypad matrix that is controlled by MCU, which makes it easy for playback control
- Built-in Near Field Communication (NFC)
- RoHS compliant

Figure 1-2 illustrates the top view of the BM63 EVB with the following components:

- 1. BM63SPKA1MC2 module
- 2. Three status LEDs
- 3. NFC tag
- 4. Mode switch (SW9)
- 5. USB connector (P9)
- 6. USB to UART converter (MCP2200)
- 7. UART port over USB connector (P3)
- 8. On board MCU (PIC18F85J10)
- 9. ICSP header (J5)
- 10. Audio control buttons, Multi-Function Button (MFB) and pairing mode button
- 11. 15V adapter jack (P2)
- 12. Internal/external MCU selection switch (SW46)
- 13. Internal/external DSP audio amplifier selection switch (SW47)
- 14. On-board DSP (YDA174) with built-in audio amplifier
- 15. Audio connector (CN1 and CN2)
- 16. External MCU/DSP header (J6)
- 17. Auxiliary input 3.5 mm jack (P8)
- 18. Microphone input 3.5 mm jack (P6)
- 19. Speaker output 3.5 mm jack (P7)
- 20. Reset button for the BM63 module (SW10)
- 21. Reset button for MCU (SW1)

For additional information on the features, refer to Chapter 2. "Hardware".

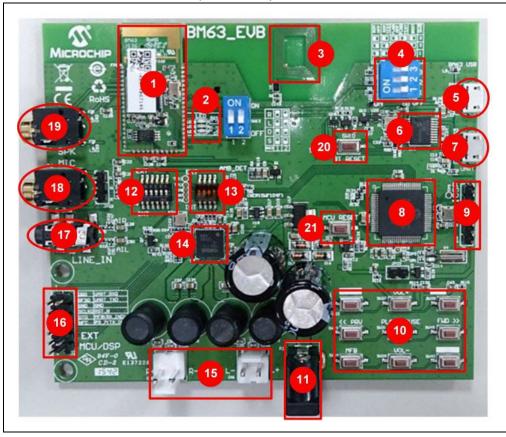


FIGURE 1-2: BM63 EVB (TOP VIEW)



Chapter 2. Hardware

This chapter describes the hardware features of the BM63 EVB. The BM63 EVB includes a range of peripheral components, see Figure 2-1.

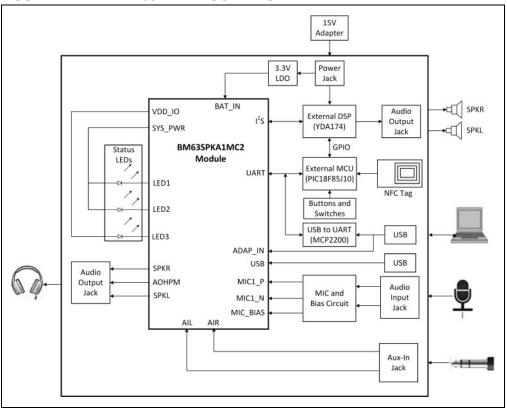


FIGURE 2-1: BM63 EVB BLOCK DIAGRAM

2.1 HARDWARE FEATURES

The following list provides the details of each component in the BM63 EVB. For detailed information about the location of these components, refer to Figure 1-2.

2.1.1 Power Supply

The 15V DC power adapter for supplying power to the BM63 EVB.

2.1.2 USB connectivity

The BM63 EVB has the following two USB ports that can be connected to the host PC using a micro-USB cable:

- Debug or program port (P3), where the USB signals are converted to/from the UART by the MCP2200
- USB port (P9), where USB signals are directly connected to the BM63 module

2.1.3 Switches and Push buttons

The functions of the switches and push buttons on the BM63 EVB are:

- SW1 Reset button for MCU
- SW9 Mode switch
- SW10 Reset button for BM63 module
- SW23 Skip the audio track backward
- SW24 (MFB) Push to turn on/off the BM63 module
- SW27 Increase volume
- SW28 Decrease volume
- SW31 Play or pause the audio playback
- SW40 Button to enter into pairing mode
- SW45 Skip the audio track forward

Table 2-1 provides the settings of Mode switch SW9 to configure the BM63 module in various operating modes.

Mode	Switch Positions	Pin Definition
Write Flash	ON 1 2 3	1: ON (P2_0: LOW) 2: ON (P2_4: LOW) 3: ON (EAN: HIGH)
Test Mode	ON 1 2 3.	1: ON (P2_0: LOW) 2: OFF (P2_4: HIGH) 3: OFF (EAN: LOW)
Flash Application Mode	ON 1 2 3	1: OFF (P2_0: HIGH) 2: OFF (P2_4: HIGH) 3: OFF (EAN: LOW)

TABLE 2-1:SWITCH SW9 DETAILS

Note: By default switch SW9 will be in Application mode.

Table 2-2 details the signals and button connections of the SW46/SW47 switch to the BM64 module and the external MCU/DSP.

Mode	SW46/SW47 Switch position	Pin Definition
On-board MCU (PIC18F85J10) and DSP audio amplifier (YDA174) signals connection to the BM63 module (default)		SW46 1: ON (NFC trigger to MCU) 2: OFF (TXIND to MCU) 3: ON (RST_N to MCU) 4: ON (HCI_TXD to MCU) 5: ON (HCI_RXD to MCU) 6: ON (MFB controlled by MCU) SW47 1: ON (DT0 to DSP) 2: ON (SCLK0 to DSP) 3: ON (RFS0 to DSP) 4: ON (NC)
External MCU and DSP audio amplifier connection		SW46 1: OFF (NFC trigger) 2: OFF (TXIND) 3: OFF (RST_N) 4: OFF (HCI_TXD) 5: OFF (HCI_RXD) 6: OFF (HCI_RXD) 6: OFF (MFB) SW47 1: OFF (DT0) 2: OFF (SCLK0) 3: OFF (RFS0) 4: OFF (NC)

TABLE 2-2:SWITCH SW46/SW47 DETAILS

2.1.4 LEDs

The functions of three LEDs are listed as follows:

- LED1 Indicates the Bluetooth connection status (UI configuration dependent)
- LED2 Indicates the Bluetooth connection status (UI configuration dependent)
- LED3 Charging indication LED (default setting is disabled)

2.1.5 Headers

The following three headers (J5, J6, JP23) are available on the BM63 EVB. The ICSP header J5 provides the programming/debugging interface for the BM63 EVB on-board MCU (PIC18F85J10). Figure 2-2 illustrates the ICSP header J5 and Table 2-3 provides the pin details and description.

FIGURE 2-2: ICSP HEADER J5

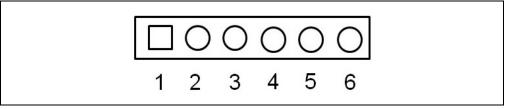


TABLE 2-3:ICSP HEADER J5

Part Number	Pin	Description
J5	1	Reset
	2	ICD3 power
	3	GND
	4	PGD
	5	PGC
	6	NC

The external MCU/DSP header J6 provides the interface to connect an external MCU/DSP to the BM63 EVB. Figure 2-3 illustrates the external MCU/DSP header J6 and Table 2-4 provides the pin details and description.

FIGURE 2-3: EXTERNAL MCU/DSP HEADER J6

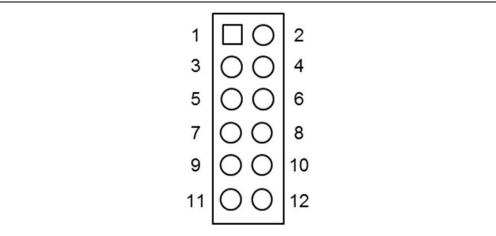


TABLE 2-4: EXTERNAL MCU/DSP HEADER J6

Part Number	Pin	Description
J6	1	I2S_DR
	2	UART_RXD
	3	I2S_RFS
	4	UART_TXD
	5	GND
	6	GND
	7	I2S_SCLK
	8	RST_N
	9	I2S_DT
	10	RX_IND
	11	NFC
	12	TX_IND

The MIC header JP23 is used for connecting a microphone to the BM63 EVB. Figure 2-4 illustrates the MIC header JP23 and Table 2-5 provides the pin details and description.

FIGURE 2-4: MIC HEADER JP23

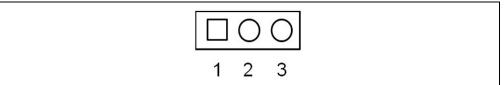


TABLE 2-5:MIC HEADER JP23

Part Number	Pin	Description
JP23	1	MIC_P1
	2	AGND
	3	MIC_N1



BM63 EVB USER'S GUIDE

Chapter 3. Getting Started

This chapter describes how to establish a Bluetooth connection between the BM63 EVB and a host device. It also demonstrates the process of updating the parameters using various tools.

This chapter includes the following topics:

- 3.1 "Requirements"
- 3.2 "Getting Started with BM63 EVB"
- 3.3 "Application Demonstration"
- 3.4 "Configuring BM63 Module"
- 3.5 "Updating EEPROM Parameters"
- 3.7 "Updating MCU Parameters"

3.1 REQUIREMENTS

The following hardware and software components are required for getting started with the BM63 EVB.

3.1.1 Hardware Requirements

- BM63 EVB
- Bluetooth enabled smartphone:
 - Android[™] device running Android 4.3 or later version
 - iOS: iPhone[®] 4S or later version
- · Windows host PC with USB port
- · Speaker, microphone, or headset
- Micro-USB cable
- MPLAB REAL ICE/MPLAB ICD 3/PICkit[™] 3

3.1.2 Software Requirements

Download the latest firmware and corresponding tools for the following applications from the Microchip web site at: www.microchip.com/BM63.

- User Interface (UI) tool
- DSP tool
- Mass Production EEPROM Tool (MPET)
- · Flash update tool
- Flash code
- EEPROM tool
- MPLAB Integrated Development Environment (MPLAB X IDE)

Note: MPLAB X IDE is available for download from the Microchip web site at: www.microchip.com/mplab/mplab-x-ide.

3.2 GETTING STARTED WITH BM63 EVB

To establish a Bluetooth connection between the BM63 EVB and a host device, perform the following actions:

1. Set switch SW9 to Flash Application mode, see Figure 3-1.

FIGURE 3-1: SW9 IN FLASH APPLICATION MODE

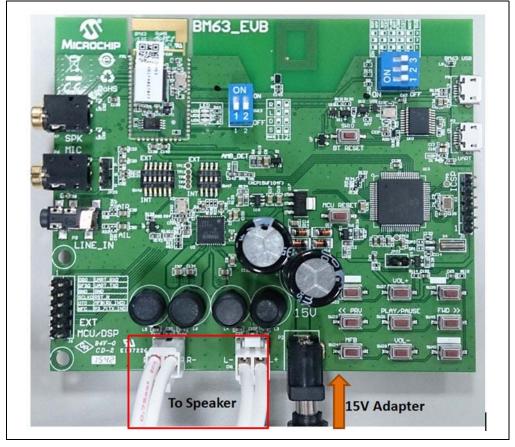


- 2. Connect the speaker line to the amplifier output connector (CN1 and CN2).
- 3. Connect 15V adapter to P2, as illustrated in Figure 3-2.

Note: Do not plug-in the USB cable.

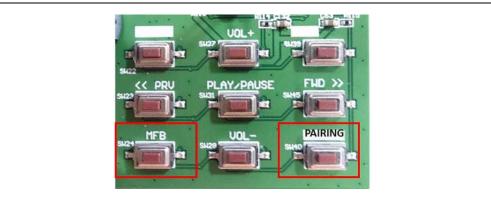
FIGURE 3-2:

USING EVALUATION BOARD



- Figure 3-3 illustrates the various push buttons on the BM63 EVB. To turn the Bluetooth on, long press SW24 (MFB), then LED1 (blue) and LED2 (red) will blink.
- 5. Long press SW40 to enter the pairing mode (depending on the UART command settings from the MCU to the Bluetooth module). LED1 (blue) and the LED2 (red) will blink alternatively to indicate that the BM63 EVB is discoverable.

FIGURE 3-3: SW24 AND SW40



- Turn on the host device Bluetooth (PC or smartphone) and it displays a list of discoverable Bluetooth devices. The BM63 EVB is displayed as "Dual_SPK" or "LE_Dual_SPK", select the device to establish the connection.
- 7. Once the BM63 EVB is connected, LED1 (blue) starts blinking fast. This indicates that the BM63 EVB is in pairing mode.
- 8. When the BM63 EVB is paired with the host device, LED1 (blue) blinks twice at regular intervals. With the default settings, the BM63 module enables Advanced Audio Distribution Profile (A2DP) for audio playback and Audio Video Remote Control Profile (AVRCP) for player control.

3.3 APPLICATION DEMONSTRATION

3.3.1 Speaker Audio Demonstration

In this demonstration, users can stream audios on the BM63 EVB using a host device (PC or smartphone). Perform the following actions for the audio demonstration, see Figure 3-4.

- Establish the connection between the BM63 EVB and a host device, refer to 3.2 "Getting Started with BM63 EVB".
- Once the connection between the BM63 EVB and the host device is established, open the audio source on the host device. Microchip recommends using a media player (for example: Windows[®] Media Player, iTunes[®], and Android[™]).
- 3. Start the audio stream on the media player, then LED1 (blue) and LED2 (red) will blink once at regular intervals.

The audio control buttons are used to:

- Control the audio output volume (long press the VOL+ or VOL- button)
- Go to the previous track (short press **<< PRV** button)
- Go to the next track (short press **FWD** >> button)
- Start/stop playing the current track (short press PLAY/PAUSE button)

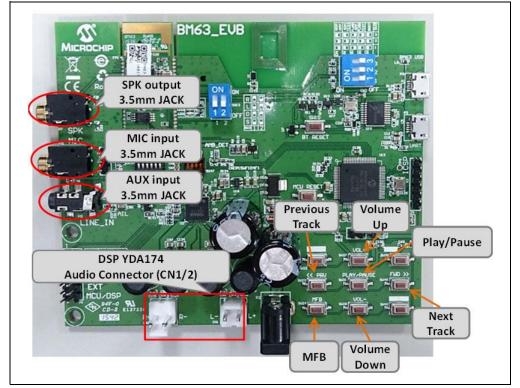


FIGURE 3-4: BM63 EVB AUDIO CONTROL BUTTONS AND INTERFACES

3.3.2 HSP/HFP Demonstration

In this demonstration, the user can explore the Headset Profile (HSP) or Hands-Free Profile (HFP) setting to receive an incoming voice call from a paired smartphone. Perform the following steps for demonstration, see Figure 3-4.

- 1. Establish the connection between the BM63 EVB and a host device using the procedure listed in **3.2** "Getting Started with BM63 EVB".
- 2. Connect the speaker to the audio out connector (CN1 and CN2) and a microphone to the MIC input (P6) on the BM63 EVB.
- 3. Initiate a call from another phone to the smartphone, that is paired with the BM63 EVB. The A2DP stream pauses and the ringtone is played on the speaker. LED1 (blue) blinks three times at regular intervals.
- 4. Press the SW24 (MFB) button on the BM63 EVB to accept the incoming call. LED1 (blue) and LED2 (red) will blink three times at regular intervals.

3.4 CONFIGURING BM63 MODULE

3.4.1 UI Tool Configuration

The User Interface (UI) tool is a configuration tool which enables the user to change the BM63 module parameters. To configure the UI parameters, perform the following actions:

- 1. Open the UI configuration tool and click **OK** to configure the UI parameters, see Figure 3-5.
 - **Note:** Download and install the UI tool, which is available on the Microchip web site: www.microchip.com/BM63. For this demonstration UITool_IS206x_012_DualModeSPK1.1_v1.03 is used.



Welcome to use Microch	nip Bluetooth UI Setting Tool!

2. In the UI configuration tool, click **Load**, see Figure 3-6.

FIGURE 3-6: UI CONFIGURATION TOOL

	'ersion & Devi	ce		
Pr	oject:		v	
IC	Package:	IS2062	Ŧ	
Ci	ustomer Versic	on:		
	Save	Export.	PICS Generator	?
Г	Load	Edit	Exit	ſ

3. From the Open window, select the default UI parameter text file (provided with the UI tool) for the BM63 module, and then click **Open**, see Figure 3-7.

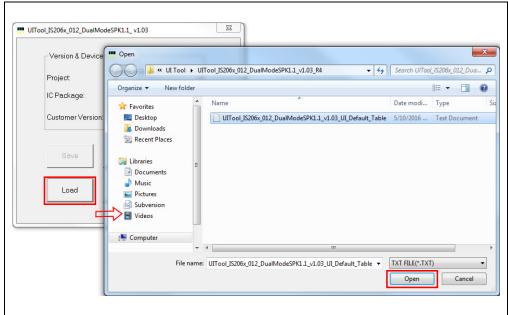


FIGURE 3-7: LOADING DEFAULT UI PARAMETERS

4. After loading the UI parameters, select "BM63" from the **IC Package** drop-down list and then click **Edit**, see Figure 3-8.

FIGURE 3-8: EDIT UI PARAMETERS

−Version & Dev	/ICe —			
Project:		IS206XGM	_012_DUAL_5	
IC Package:		BM63	•	
Customer Versi	ion:	2016-05-09		
Save		Export.	PICS Generator	?
Load		Edit	Exit	

- 5. In the Main Feature dialog, the user can enable/disable the **Supported Profile** and audio line-in function **Button** and set the following parameters, as illustrated in Figure 3-9.
 - a) Select the "UART Command" check box, which allows the module to be controlled by the MCU through the UART interface.
 - b) Select the "Ind.1" check box to enable the external audio amplifier.
 - c) Click Next.

FIGURE 3-9: MAIN FEATURE SETTINGS

Supported Profile —		1.0000.000	
₩ HFP/HSP	I⊽ A2DP	AVRCP AVRCP Con AVRCP Con AVRCP Targ	troller
Button			
 ✓ Btn0(MFB) ✓ Btn4(P3_3) 		✓ Btn2(P2_7)	☑ Btn3(P0_5)
Function Enable			
Slide Switch	AUX Line In UART Comma I Rx IND I Tx IND I Tx IND	⊟ Buzze nd a ⊟ I2S	ər
Function GPIO Assi		a sama	and another
Slide SW NFC		5 P0_3 P2_0	P2_4 P3_7
Ind.1 Ind.2		b	
Buzzer Tx IND CHG/AUX-IN Ind.	Г	ГГ	
			C Next
Cancel			

Note: The audio output will be routed to the speaker if I^2S is not selected.

The System and Functional Settings dialog with various options (tabs) is displayed to configure the parameters. In the Sys. Setup2 tab, from Indication 1 Setting section, enable External Amplifier Indication, as illustrated in Figure 3-10. Click Help to get more detailed information.

Button Setup PMU Setup	CODEC Setup	
Sys. Setup1 Sys. Setup2 Sys. Set	tup3 LED Setup1 LED Setu Modification	All and the second s
⊢Name Frag Segment		2
Name Fragment Dual_SPK	(32 Char) Help	
ool_IS206x_012_DualModeSPK1.1_v1.03_UI_Default_	Table.txt - UITool_IS206x_012_DualModeSPK1.1_ v1.03	
Button Setup PMU Setup	p CODEC Setup BLE Setup	
Sys. Setup1 Sys. Setup2 Sys. S	Setup3 LED Setup1 LED Setup2 Tone Setup3	tup
-Indication Function		^
	Help	
Indication 1 Setting		
Indicate Pin1 Polarity (P1_5)	High Active	
Audio(SBC) Indication	Disable 👻	
Voice(SCO) Indication	Disable 💌	-
Ring Tone Indication	Disable	
Incoming Call Indication	Disable amplifier enab	ble
External Amplifier Indication	Enable	
HF Link Indication	Disable ~	Ē
A2DP Link Indication	Disable *	
Button Event Trigger Indication	Disable *	
-Indication 2 Setting		
Indicator Pin2 Polarity (P0_3)	High Active 👻	
Audio(SBC) Indication	Disable V	
Voice(SCO) Indication	Disable V	
VOICELSCL71 INDICATION	Disable	

FIGURE 3-10: ENABLE EXTERNAL AMPLIFIER INDICATION

 In Sys. Setup1 tab, from the UART Setting section, enable Power On by "Power On" Command, see Figure 3-11. The module will power-on by UART command and not by the MFB key.

Button Setup	PMU Setup	CODEC	Setup	BL	E Setup
Sys. Setup1 Sys. Se	tup2 Sys. Set	up3 LED Setup	1 LED Se	tup2	Tone Setup
- Uart Setting Enable HCI Uart UART Baudrate CPU Idle Mode Wake Up Delay Time CLIP Name or Number		Enable 0x07: 19200 Disable 30 (0~254; 0: 0 Name Priority	✓ ✓ ✓ disable; unit:0.3*	125 ms)	Help
Power On by "Power O UART Protocol Tx Pag		Enable Enable	•		
-NFC Setting NFC Detection Enable NFC Stable Time		Disable 4 (0~254 unit			Help
Link Quality Setting		Disable	•		Help
User MMI Data Setting	Disable				Help

FIGURE 3-11: UART COMMAND SETTING

8. After setting up the parameters, click **Finish**. A notification is displayed to check the EEPROM size on the system. Click **OK**, see Figure 3-12.

Button Setup PM	U Setup	CODEC Set	tup	BLE Setup	
Sys. Setup1 Sys. Setup2	Sys. Setup3	LED Setup1	LED Setu	p2 Tone Se	etup
Piezo PWM Frequency	270	0 (50-2000	10 unit Hz)		
Uart Setting			315		
Enable HCI Uart	Ena	ible 🔄]	Help	
UART Baudrate	0×0	3: 115200 💌]		
CPU Idle Mode Notification		-	×	J	
Wake Up Delay				ms)	
	n size is 4096 bytes!!				
The Suggested	EEPROM must be e	qual to or greater th	an 24C32		
Davies On the W					
Power On by "I					
Power On by "f UART Protocol			ОК		
				J	
UART Protocol	Dis	able		Help	[
UART Protocol	Dis 4		<u>ок</u>]	Help	
UART Protocol NFC Setting NFC Detection Enable		able _	<u>ок</u>]	Help	
UART Protocol NFC Setting NFC Detection Enable NFC Stable Time	4	able _	<u>ок</u>]	Help	

FIGURE 3-12: EEPROM NOTIFICATION

9. Click **Save** to save these UI parameters as a .txt file, see Figure 3-13.

Version & Devid	ce	1	
Project:	IS206×GM	012_DUAL_5	
IC Package:	BM63	•	
Customer Versic	on: 2016-05-09		
Save	Export.	PICS Generator	?
Load	Edit	Exit	

FIGURE 3-13: SAVING UI PARAMETERS

10. From the Save As window, select the file location, and then click **Save**, see Figure 3-14.

FIGURE 3-14: SAVE AS WINDOW

Γ

Version & Devic	Save As		UITool_IS206x_012_DualModeSPK1.1_v1.03_R4		Search UITool_IS20	5. 012 F	
Project.		folde		• 4 ₂			Jua
IC Package:	Downloads	roidei	Name	Date modified	Туре	Size	
Customer Version	📃 Recent Places	_	UITool_IS206x_012_DualModeSPK1.1_v1.0	5/10/2016 9:47 AN	/ Text Documer	t	10
Save	 Libraries Documents Music Pictures Subversion Videos 	H					
	👰 Computer						
	· · · · ·	-	•	m			
	File name: Save as type:	XT FIL	E(*.TXT)				
	Hide Folders				Save	Cano	el

11. After saving the UI parameters, click Exit.

3.4.2 DSP Tool Configuration

The DSP configuration tool provides the visual interface to configure the DSP parameters for the voice and the audio signal processing functions. To configure the DSP parameters, perform the following actions:

1. Open the DSP tool and a dialog displays with various options (tabs) to configure the parameters, see Figure 3-15.

FIGURE 3-15: DSP TOOL SETTINGS

Main Function	Voice Function	Audio Function 12S/P	CM	
DSPTool_	_IS206x_012_Du	alModeSPK1.1_v1.03 [IC Version	SP Configuration Tool 1	.03 odeSPK1.1 v1.03 +
Mi	CROCHI			0003FN11_V1.03
創傑科	技股份有限 chnologies	公司		
Load				DSP Parameter DSP Default
Save	Default.txt			Exit

Note: Download and install the DSP tool, which is available on the Microchip web site: www.microchip.com/BM63. For this demonstration DSPTool_IS206x_012_DualModeSPK1.1_v1.03 is used.

2. In the **Voice Function** tab, set the parameters as illustrated in Figure 3-16.

	Voice Function A	udio Function 12S/PCN	4		
CVSD Encoder 🔫	Digital Gain/Comfort Noise	Equalizer (EQ)	n AEC/AES	Filter MIC (Cod Gair	ec 🖛 🗍
	CVSD Decoder →	Noise Reduction (NR)		→ DAC (Speaker Gain) →	•
Filter NR	EQ SpkGain	MIC Gain/ComfortNoi	se AEC/AES		
Speaker –	HighPass Filter	Cutoff Freq: 300H	z 🔹		
MIC – Higl	Pass Filter	Cutoff Freq: 210H	z •		
				11 700000000	and the second se

FIGURE 3-16: DSP VOICE FUNCTION SETTING

vlain Fu	nctio	n Voice	Fun	ction	udio	Functio		2S/PCM	1						
	1000	C/AAC coder			Audi Effec Lin	»] ≁ [Equa (EC		(SI	DAC beaker dain)	►Ű]			
	iston ker G T	Gain S nized Ga Sain -38dB 0xa2 -14dB 0xee	in S ¥ ¥	etting -35dB 0×a5	××	Num of	X X X	els [-29dB 0xc5 -5dB 0xf7	¥	-26dB 0xe2 -2dB 0xfa		-23dB Oxe5 -1dB Oxfb	×	-20dB	* * * 16
	oad												_	SP Para DSP De	

3. In the Audio Function tab, set the parameters as illustrated in Figure 3-17.

4. Click **Save** to save these DSP parameters as .txt file, see Figure 3-18.

lain Functi	ion Voice Fun	ction Audio Function	I2S/PCM			
	BC/AAC Decoder		alizer EQ) DAC (Speaker Gain)	-		
	E2PROM Table	e File:			x	
- 1	Save in:	DSPTool_IS206x_012_D	DualModeSPK1.1_v1 👻	G 🟚 🖻 🛄 -		
	C.	Name		Date modified	Туре	
ineln S	Recent Places	Default		5/9/2016 9:46 AM	Text Docu	
🔽 Cus	Desktop					
Speak 01	A contraction					
Mute 0×00	Libraries				x	
UXUU						
-17dB 0xeb	Computer				X	
					6	
	Network	•	III		•	
	IVELWOIK	File name: Default b	đ	•	Save	
		Save as type: TXT Files	s (*.bd)	-	Cancel	
C						
					DSP Parameter	1
Load					DSP Default	ī.
Save	Defau	lt h.d			Exit	Ĩ

5. After saving the DSP parameters, from the notification pop up, click **OK**, see Figure 3-19. Click **Exit** to exit the DSP tool settings.

Main Function Voice	Function Audio Function 12S/PCM	
SBC/AAC Decoder	Audio Effect LineIn Audio Input	
-	ound Effect EQ	
Customized G	DSPTool_IS206x_012_DualModeSPK1.1_v1.03	
Speaker Gain 01	F:\BM6x Tools\DSP tool\DSPTool_IS206x_012_DualModeSPK1.1_v1.03\Default.txt is saved successfully!	
Mute ≖ -38dE 0×00 ≖ 0×a2	20dB ≖ Ixe8 ≖	
-17dB ≖ -14dE	OK OdB 🖛	
0×eb ▼ 0×ee	J×tc ¥	
	DSP Parameter	ר
	Dor Falanicici	
Load	DSP Default	1

FIGURE 3-19: SAVE NOTIFICATION

3.4.3 MPET Tool Configuration

The MPET tool is used to merge the UI and the DSP parameters and generate a patch file (.ipf) or binary file (.bin). To generate a patch file using the MPET tool, perform the following actions:

- 1. Open the MPET tool and then click **Next** to continue with the configuration settings, see Figure 3-20.
 - **Note:** Download and install the MPET tool, which is available on the Microchip web site: www.microchip.com/BM63. For this demonstration MP_V2.1.29.4797 is used.



FIGURE 3-20: MPET TOOL SETTING

2. Select **UI Patch Only** to merge the UI and the DSP parameters and then click **Next**, as illustrated in Figure 3-21.

Note: For the UI parameter settings, refer to **3.4.1 "UI Tool Configuration**", and for the DSP parameter settings, refer to **3.4.2 "DSP Tool Configuration**".

FIGURE 3-21: MERGE UI AND DSP PARAMETERS

Type of Merged Output Select EEPROM output against the item in MPBT.	isso
Please choose the file format of merge tool output, then click on Next.	
O Default (Full EEPROM, *.bin)	
Select Default to generate full EEPROM binary image for MPBT #500 Write EEPROM.	
The option is recommended while preparing production of a whole new model.	
Customers create a completed EEPROM content by merging the ISSC default and all	
related customized UI, RF, PMU, (or Audio) parameters.	
OUI Patch Only (Customized UI Updates, *.ipf) 1	
Select UI Patch Only, only the customized UI updates are outputted for MPBT #550	
EEPROM Patch. This opton is used while customer modify UI behavior against the	
samples which have passed mass-production PCBA test.	
2	
Back (B) Next (N)	Cancel

3. Click **Browse** to load the default .bin file (provided with the MPET tool). From the Open window, select the .bin file and then click **Open**, see Figure 3-22.

Select latest ISSC Default Browse ISSC default as a ba	ase	issc		
Please choose the default bi	n file	Browse		
∎ Open 🔾 💭 🗢 🚺 🕨 Computer	▶ New Volume (F:) ▶ BM6x Tools ▶ EEPROM table	e 🗸 49	Search EEPROM table	
Organize New folder			8≡ ▼	
☆ Favorites	Name	Date modified	Туре	Size
Desktop Downloads Recent Places Documents Music Pictures Subversion Videos	L IS206X_012_DUALMODESPK1.1_E1.0.0.2_0	-3/16/2010 3:42 PM	VLC media file (.bin)	129 KI
💻 Computer	•	III		
			EEPROM Image(*.bin)	

FIGURE 3-22: LOADING DEFAULT BIN FILE

4. The bin file description is displayed, click **Next**, see Figure 3-23.

Select latest ISSC Default Browse ISSC default as a base		is
Please choose the default bin file		
F:\BM6x Tools\EEPROM table\IS206X_012_DUALMODESPK1.1_E1.0.0	0.2_0FCD.Ł	Browse
BIN file description: Format Version : 4 Solution Name : IS206X_012_DUALMODESPK1.1_E1.0_BETA EEPROM Version : 1.0.0.2 Company Name : ISSC Project Name : IS206X_012_DUALMODESPK1.1_E1.0 TXT Files : IPF Files :	*	
4	Ŧ	

FIGURE 3-23. DEFAULT BIN FILE SETTING

 Click the "+" button to load the UI and the DSP parameters (.txt file) into the MPET tool to merge with the EEPROM table and then click Next, as illustrated in Figure 3-24.

Browse and include the files	rs From Files. stored customized settings			is
Customized settings in select	ted BIN			
FileName		Version	Brief	
•	m		1	•
Merge List			O	0
FileName 2				
	JITool_IS206x_012_DualMode			
F:\BM6x Tools\DSP tool	VDSPTool_IS206x_012_DualMo	odeSPK1.1_v1.0	03\test_Default.	txt
	m			
•	m			

FIGURE 3-24: CUSTOMIZED SETTINGS TO MERGE

6. Select an output file path to create the merged EEPROM table (.ipf file), and then click **Next**, see Figure 3-25.

FIGURE 3-25:	SELECTING OUTPUT FILE NAME AND PATH

Select Destination to Save Output	Inc
Assign output name and path	iss
Please select output file name and path	1
F:\BM6x Tools\Beta_MP_V2.1.29.4797\IS206X_012_DUAL_MODESPK_	V1.1.ipf Output File
	2

٦

7. Click **Generate** to generate the EEPROM table (.ipf file), see Figure 3-26.

	rate Binary Output the selections			isso
Click Generate	to continue, or click Back i	f you want to review or	change setting.	
Solution (IC) IS206X_C Output File: F:\BM6x Merge Files: F:\BM6x	Only (Customized UI Upda 112_DUALMODESPK1.1_E1 Tools\Beta_MP_V2.1.29.47 Tools\UI Tool\UITool_IS206	.0_BETA 797\IS206X_012_DUAL_ 5x_012_DualModeSPK1.	MODESPK_V1.1.ipf 1_v1.03_R4\test_UITool_IS20 K1.1_v1.03\test_Default.txt	*
4			,	Ŧ

8. The calibration parameters included in the UI patch file can be selected or ignored and then click **Next**, see Figure 3-27.

Note: If the items are selected, the calibration parameters of the . ipf file will over write the parameters in the device.

	felline at elli
	g the UI Patch file.
[SYS:RUN-TIME] Device List 6	
[SYS:RUN-TIME] Device List 7	
[SYS:RUN-TIME] Device List 8	
[SYS:RUN-TIME] Device Link priority	
[SYS:RUN-TIME] Device A2DP Index	
B	ack (B) Next (N) Cancel
	SYS:RUN-TIME] Device List 7 SYS:RUN-TIME] Device List 8 SYS:RUN-TIME] Device List 8 SYS:RUN-TIME] Device Link priority

9. After generating the merged EEPROM table (.ipf file), click **Finish** to exit the wizard, see Figure 3-28.

	Completing the MPET Wizard
	Output Path:
	F:\BM6x Tools\Beta_MP_V2.1.29.4797
	Output file:
ISSC	IS206X_012_DUAL_MODESPK_V1.1.ipf
ISSC Technologies Corp.	
	Click Finish to exist generate.
1	
	\frown
	Finish

FIGURE 3-28: MERGED EEPROM TABLE

3.5 UPDATING EEPROM PARAMETERS

Perform the following actions to update the EEPROM parameters:

1. Set switch SW9 to Test mode, see Figure 3-29.

FIGURE 3-29: SWITCH SW9 IN TEST MODE



Connect the BM63 UART Connector (P3) port to a host PC using the micro-USB cable, see Figure 3-30. The default LED behavior in Test mode is: LED1 (blue) and LED2 (red) will be ON.

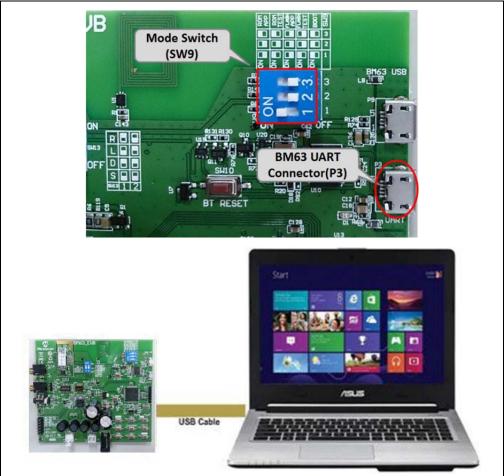


FIGURE 3-30: EEPROM PARAMETER SETUP

Note: Download and install the EEPROM tool, which is available on the Microchip web site: www.microchip.com/BM63. For this demonstration EEPROM_Tool_V2.1.29.4800 is used.

3. Open the EEPROM tool and a window displays, see Figure 3-31.

EEPROM_Tool Ver:2.1.29.4800	— — X
INTERFACE	
COM Port COM7 -	
IC/Module Identify MPSE Name:	
WRITE EEPROM	
File Path	
	Write
	Exit

FIGURE 3-31: EEPROM TOOL

4. Specify the **COM Port** and click **IC/Module Identify**, see Figure 3-32.

EEPROM_Tool Ver:2.1.29.4800	
	MICROCHIP
INTERFACE 1 COM Port COM7 -	2
IS206XGM 012 DUAL SPK V1.1 IS206X_012_DUALMODESPK1.1	E1.0_BETA
WRITE EEPROM	
File Path	
	Write
	Exit

FIGURE 3-32: EEPROM TOOL SETTINGS

5. Click **Browse** and select the generated patch file (.ipf) to write to the EEPROM parameter table on the BM63 EVB, see Figure 3-33.

Note: The patch file (.ipf) is generated using the MPET tool. For information on generating the patch file, refer to **3.4.3** "**MPET Tool Configuration**".

FIGURE 3-33: LOADING GENERATED PATCH FILE

		MICROCHIP
INTERFACE		
COM Port	COM7 -	
TC /Modu	e Identify MPSE Name: IS206XGM_01	12_DUAL_SPK_V1.1
Tellinoud	IS206X_012_0	DUALMODESPK1.1_E1.0_BETA
	L	
WRITE EEP		
WRITE EEP File Path		S206X_012_DAULMODESPK1.1_FULL_CLS2_I2S(BM)
		S206X_012_DAULMODESPK1.1_FULL_CLS2_J2S(BM/ Write

 Click Write to program the EEPROM parameters on the BM63 EVB. After programming the EEPROM parameters, a message is displayed. Click OK as illustrated in Figure 3-34.

A EEPROM_To		3
		MICROCHIP
INTERFACE		
COM Port	COM7 🔻	
IC/Modu WRITE EEP File Path		te Finish
		Exit

FIGURE 3-34: WRITE EEPROM

7. Click **Exit** and remove the micro-USB cable. Then set switch SW9 to Flash Application mode (see Figure 3-35) and reboot.

FIGURE 3-35: SWITCH SW9 IN FLASH APPLICATION MODE



3.6 UPDATING FLASH CODE

Flash programming is required to update the firmware with a newer version or a specific version. To update the flash code, perform the following actions:

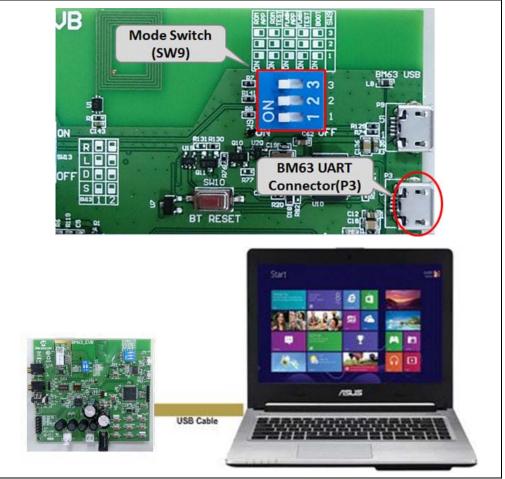
1. Set switch SW9 to Write Flash mode, see Figure 3-36.





Connect the BM63 UART connector (P3) port to a host PC using a micro-USB cable, as illustrated in Figure 3-37. The default LED behavior in Write Flash mode is: LED1 (blue) and LED2 (red) will blink.





Note: Download and install the isbtflash.exe firmware update tool, which is available on the Microchip web site: www.microchip.com/BM63. For this demonstration, flash code Dual Spk V1_1 svn version 6158 is used.

3. Open the isbtflash.exe firmware update tool on a host PC. Specify the COM Port and then click Connect, as illustrated in Figure 3-38.

FIGURE 3-38: ISBTFLASH TOOL

Access I						(
port	OM7 baudrate	115200:240	 Banks 	16 - Flash	UD	Connect
Flash Up	date					
Images	Prepare: Load all images					Browse
			1	Update	Verify	Burst Upda

4. Click **Browse** to select the Flash code files (.hex), downloaded from the Microchip web site, see Figure 3-39.

port COM7 👻 baud	Irate 115200:240 - Banks 16 - Flash	nID 1CDA Disconnec	t	
Flash Update				
Images Prepare: Load all images	ages	- Browse		
Open		and hereas	-	
) v 📕 « BM6x Too	Is Firmware Dual Spk V1_1 svn version 6158	•	€	ual Spk V1_1 svn vers
Organize 🔻 New folde	r	1		:= - □ (
☆ Favorites	Name	Date modified	Туре	Size
Nesktop	BT5506_SHS_FLASH.H00	5/5/2016 11:42 AM	H00 File	181 KB
Downloads	BT5506_SHS_FLASH.H01	5/5/2016 11:42 AM	H01 File	181 KB
🖳 Recent Places	BT5506_SHS_FLASH.H02	5/5/2016 11:42 AM	H02 File	161 KB
	BT5506_SHS_FLASH.H03	5/5/2016 11:42 AM	H03 File	183 KB
🧊 Libraries	BT5506_SHS_FLASH.H04	5/5/2016 11:42 AM	H04 File	156 KB
Documents	BT5506_SHS_FLASH.H05	5/5/2016 11:42 AM	H05 File	150 KB
🎝 Music	BT5506_SHS_FLASH.H06	5/5/2016 11:42 AM	H06 File	172 KB
Pictures	BT5506_SHS_FLASH.H07	5/5/2016 11:42 AM	H07 File	181 KB
Subversion	BT5506_SHS_FLASH.H08	5/5/2016 11:42 AM	H08 File	171 KB
Videos	BT5506_SHS_FLASH.H09	5/5/2016 11:42 AM	H09 File	167 KB
	BT5506_SHS_FLASH.H10	5/5/2016 11:42 AM	H10 File	45 KB
🖳 Computer	BT5506_SHS_FLASH.H11	5/5/2016 11:42 AM	H11 File	105 KB
	BT5506_SHS_FLASH.H12	5/5/2016 11:42 AM	H12 File	112 KB
📬 Network	BT5506_SHS_FLASH.H13	5/5/2016 11:42 AM	H13 File	45 KB
	BT5506_SHS_FLASH.H14	5/5/2016 11:42 AM	H14 File	45 KB
	BT5506_SHS_FLASH.H15	5/5/2016 11:42 AM	H15 File	45 KB
				1000
File na	me: "BT5506_SHS_FLASH.H15" "BT5506_SHS_FLA	SH.H00" "BT5506_SHS_FL	 Firmware 	mage and DSP code 🔻

FIGURE 3-39: LOADING FLASH CODE FILES

5. Click **Update** to write the Flash code on the BM63 module, Figure 3-40.

Note: Alternately, the user can click **Burst Update** to write the Flash code which is faster than **Update**.

URE 3-40:	UPDATING FLASH CODE	
ISSC Bluetooth Fla	sh Tool 3.1.1.29 R10(12~15) (DSP)	
	▼ baudrate 115200:240 ▼ Banks 16 ▼ FlashI	D 1CDA Disconnect
Flash Update		
Images Prepare: L		Browse
	Update	Verify Burst Update

6. After the Flash code update, click **Disconnect** and then remove the micro-USB cable. Set SW9 to Flash Application mode (see Figure 3-35) and then reboot.

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3.7 UPDATING MCU PARAMETERS

The on-board MCU is pre-programmed for dual-mode, and the MCU parameters needs to be changed for other applications. To update the MCU parameters, perform these actions:

- 1. Plug the 15V DC adapter into the P2 jack to supplying power to the MCU.
- 2. Connect the MPLAB REAL ICE/MPLAB ICD 3/PICkit 3 to ICSP header J5 and then connect it to a host PC using the USB cable.

Note: Download and install the MPLAB X IDE tool, which is available on the Microchip web site: www.microchip.com/mplab/mplab-x-ide.

3. Ensure that a jumper on JP33 is connected. Open the MPLAB X IDE tool and a window displays, see Figure 3-41.

	ngs Help			ALC: NO.		
Select Dev	rice and Tool			Results		
Family:	All Families		•			
Device:	PIC18F85J10			Apply Due Ce		
Devale.	ricioro310			rass Ci		
Tool:	ICD 3 S.No : Л	T153110575	- Conn	Fail Co		
				Total Co	ount: 5	
		-	-	1 -		
3	Program	Erase	Read	Venify	Blank Check	
Source: P	lease click on brow	, vse button to import a hex f	île		Browse	
		vse button to import SQTP :			Browse	
Nem. [·						
					± Less	
put						
)-01-141	12:24:51+0800- Ci	ompleted loading IPE.				

FIGURE 3-41: MPLAB[®] X IDE TOOL

4. From Settings, select "Advanced Mode", see Figure 3-42.

Sele		Advanced Mo	de			Results	
Far	~	Erase All befor	re Program	-			
	\checkmark	Auto Downloa	id Firmware			Checksum	7ABE
De		Manual Down	load Firmware	•	Apply	Pass Count	
To	•	Hold in Reset		•	Connect	Fail Count	
		Release from I	Reset		L	Total Count	5
		Communicatio	on				
	5	Program	Erase	2	Read	Verify	🖳 Blank Check
C		Plasse slick on how	ese button to import a he	u file		JL	Brows
SQ.	TP:	Please chck on brov	we button to import SQT	.P file			Browse
							± Less
lput							
tput .6-01	-141	12:24:51+0800- C	Completed loading IPE.				
	-141	112:24:51+0800- C	ompleted loading IPE.				
	-141	[12:24:51+0800- C	completed loading IPE.				
	-141	[12:24:51+0800- C	completed loading IPE.				
	-141	112:24:51+0800- C	completed loading IPE.				
	-141	[12:24:51+0800- C	completed loading IPE.				
	1-141	112:24:51+0800- C	completed loading IPE.				

FIGURE 3-42: ADVANCED MODE SETTINGS

 The MPLAB X IDE tool displays a window with various options (tabs) to configure the parameters. Click **Power** tab, and then enable **Power Target Current** from Tool, as illustrated in Figure 3-43.

View Settings Help		
• Operate	Voltage Settings	
🗑 Power	VDD: 3.25 •	
Memory	VPP: 3.25 N/A VDD Nom: 3.25 N/A	
 Environment 	VDD App: 3.25	
 SQTP 		Reset Vollages
Production Mode	ICSP Options	
Settings	Power Target Circuit from Tooj	High Voltage on MCLF
Log out		

FIGURE 3-43: POWER TARGET CURRENT FROM TOOL

6. Select **Operate** tab, click **Connect** to connect with the MPLAB ICD3, as illustrated in Figure 3-44. Click **Browse** to load the dual-mode PIC18 code, and then click **Program** to program it.

	Select Device and Tool	Results
😔 Operate	Family: All Families -	CP=OFF Checksum: 7ABE
	1	Checksum: 7ABE
	Device: PIC18F85J10	Pass Count 4
• Power	Tool: ICD 3 S No : JIT153110575 - C	ommect 2 Total Count: 5
Memory	Program Brace L Read	Venity Elank Check
	Source: Please click on browse button to import a hex file	3 Brow
Environment	SQTP: Please click on browse button to import SQTP file	Brow
• SQTP		
	Output	
	2016-01-14T12:24:51+0800- Completed loading IPE.	
Production Mode		
Settings		

FIGURE 3-44: DEVICE AND TOOL SETTING

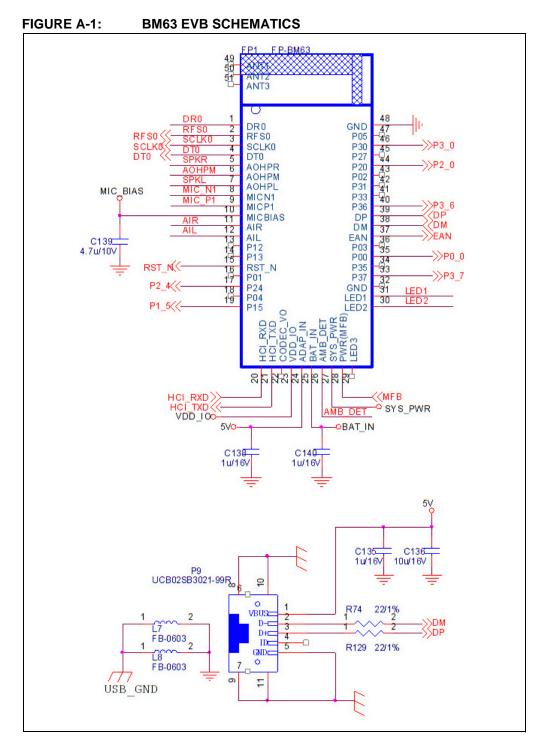
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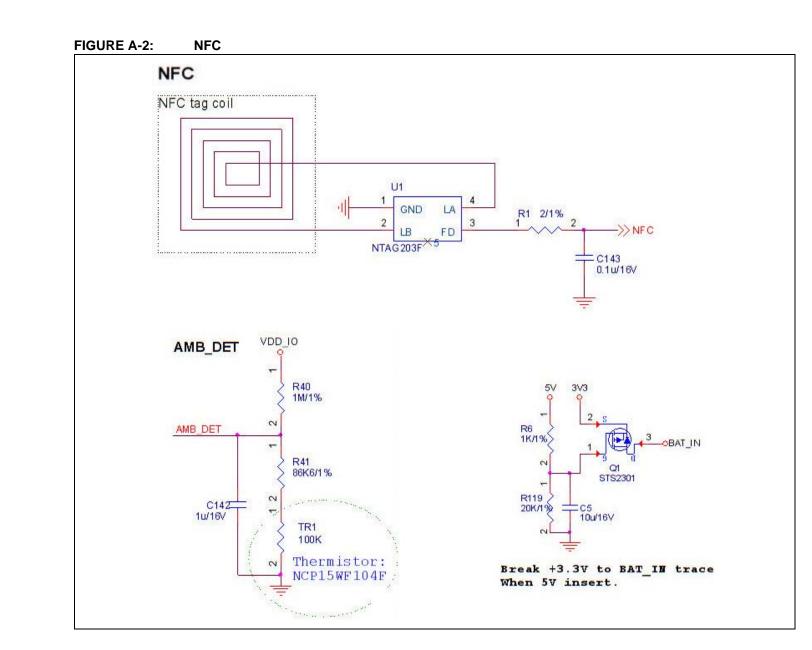
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Appendix A. Schematics

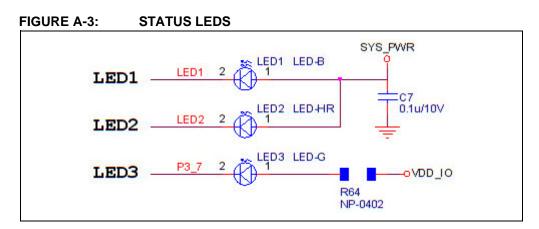
A.1 REFERENCE SCHEMATICS



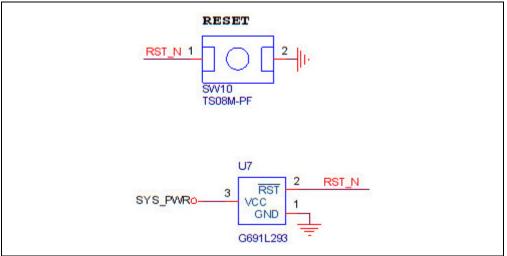
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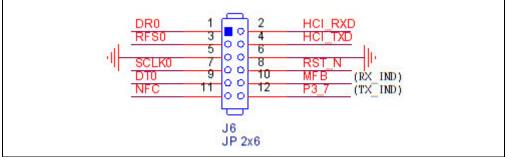
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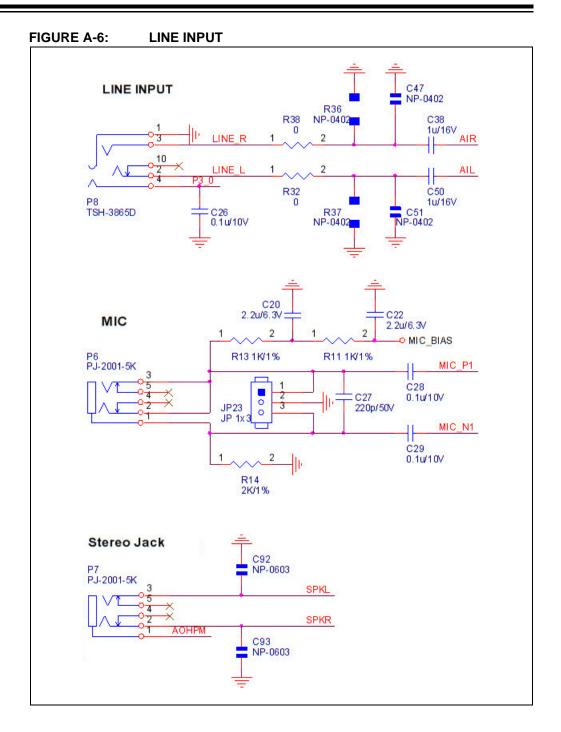


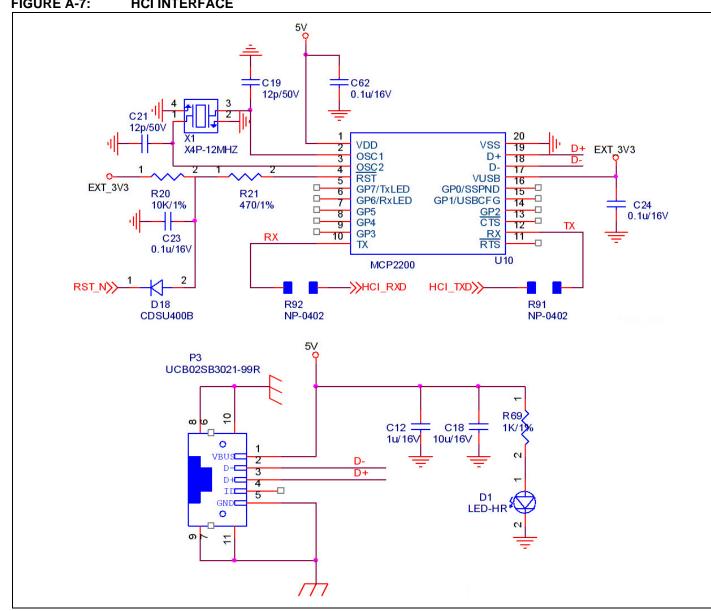




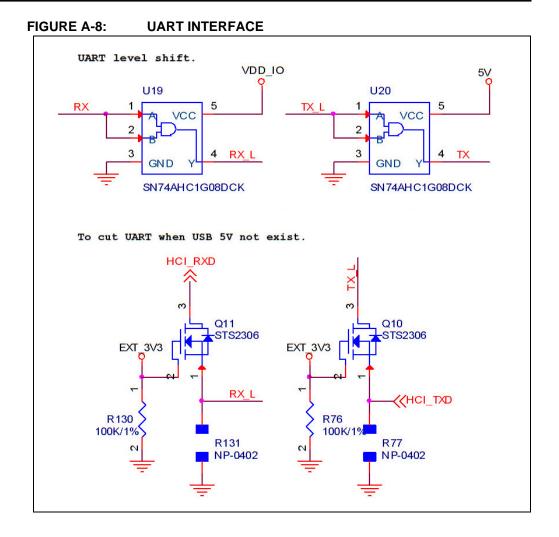


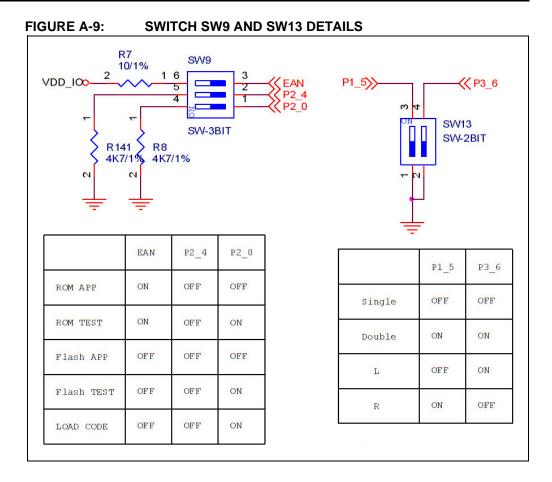


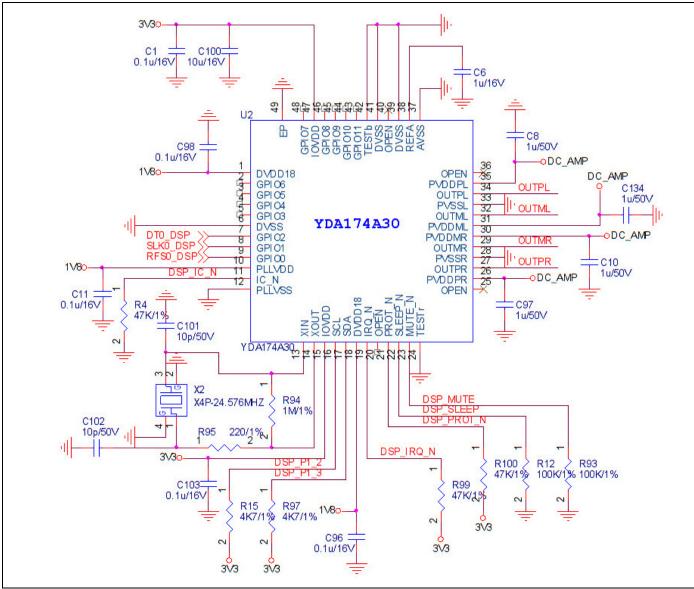




Schematics







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FIGURE A-11: DSP/MCU INTERFACE

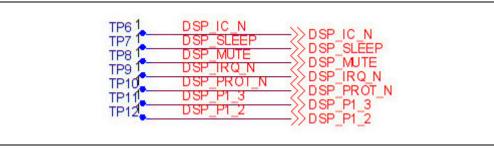
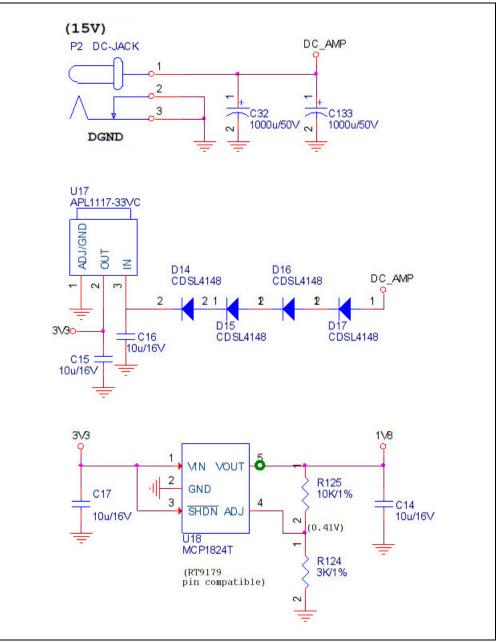
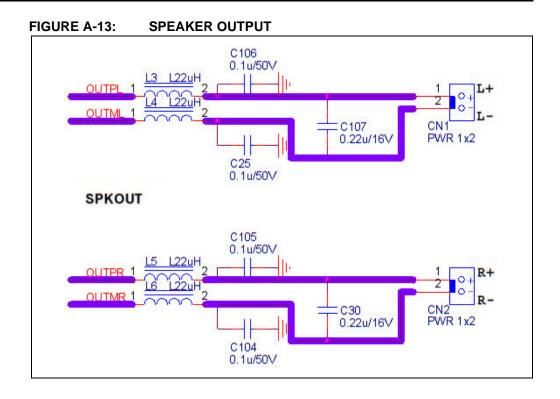
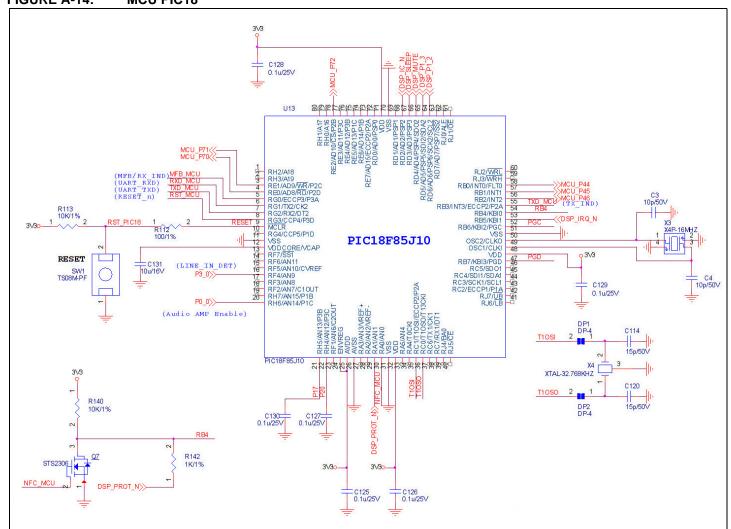


FIGURE A-12: POWER SUPPLY







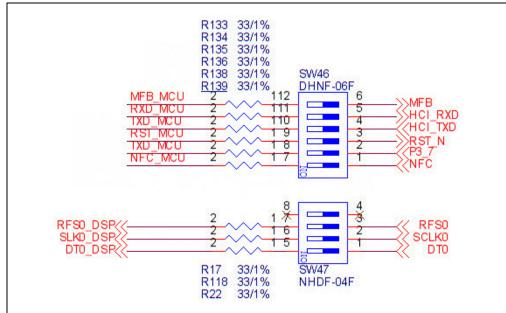
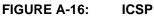
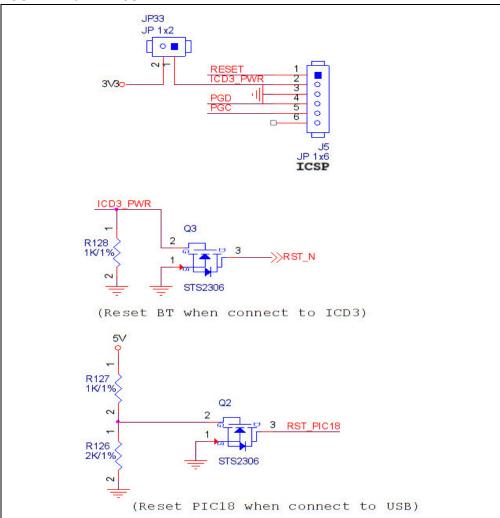
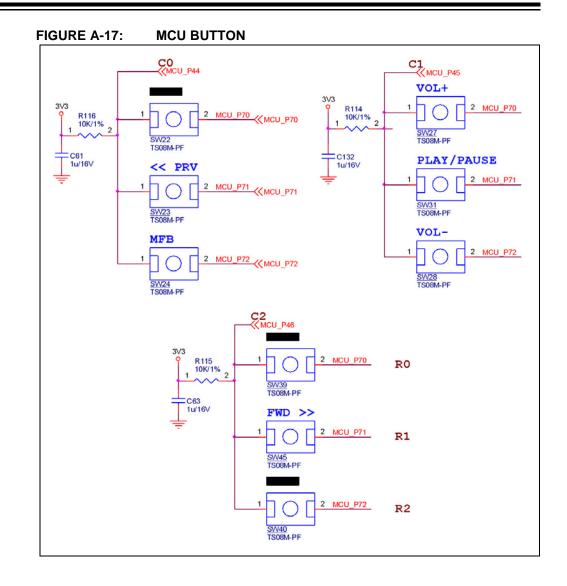


FIGURE A-15: SWITCH SW46 AND SW47 DETAILS







NOTES:

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