BM63 Evaluation Board (EVB) User's Guide

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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

Derek Carlson

12-Sep-14
Date

NOTES:

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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 "DSXXXXXXXXA", where "XXXXXXXX" 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	*File > Save*
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>
`Plain Courier New`	Sample source code	`#define START`
	Filenames	`autoexec.bat`
	File paths	`c:\mcc18\h`
	Keywords	`_asm, _endasm, static`
	Command-line options	`-Opa+, -Opa-`
	Bit values	`0, 1`
	Constants	`0xFF, 'A'`
`Italic Courier New`	A variable argument	*`file`*`.o`, where *`file`* can be any valid filename
Square brackets [ ]	Optional arguments	`mcc18 [options]` *`file`* `[options]`
Curly brackets and pipe character: { | }	Choice of mutually exclusive arguments; an OR selection	`errorlevel {0|1}`
Ellipses...	Replaces repeated text	`var_name [, var_name...]`
	Represents code supplied by user	`void main (void) { ... }`
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

Microchip provides online support via our web site at: http://www.microchip.com. This web site makes files and information easily available to customers. Accessible by most Internet browsers, the web site contains the following information:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip consultant program member listings
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listings of seminars and events; and listings of Microchip sales offices, distributors and factory representatives

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To register, access the Microchip web site at www.microchip.com, click on Customer Change Notification and follow the registration instructions.

The Development Systems product group categories are:

- **Compilers** – The latest information on Microchip C compilers and other language tools
- **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

Users of Microchip products can receive assistance through several channels:

- 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:

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:

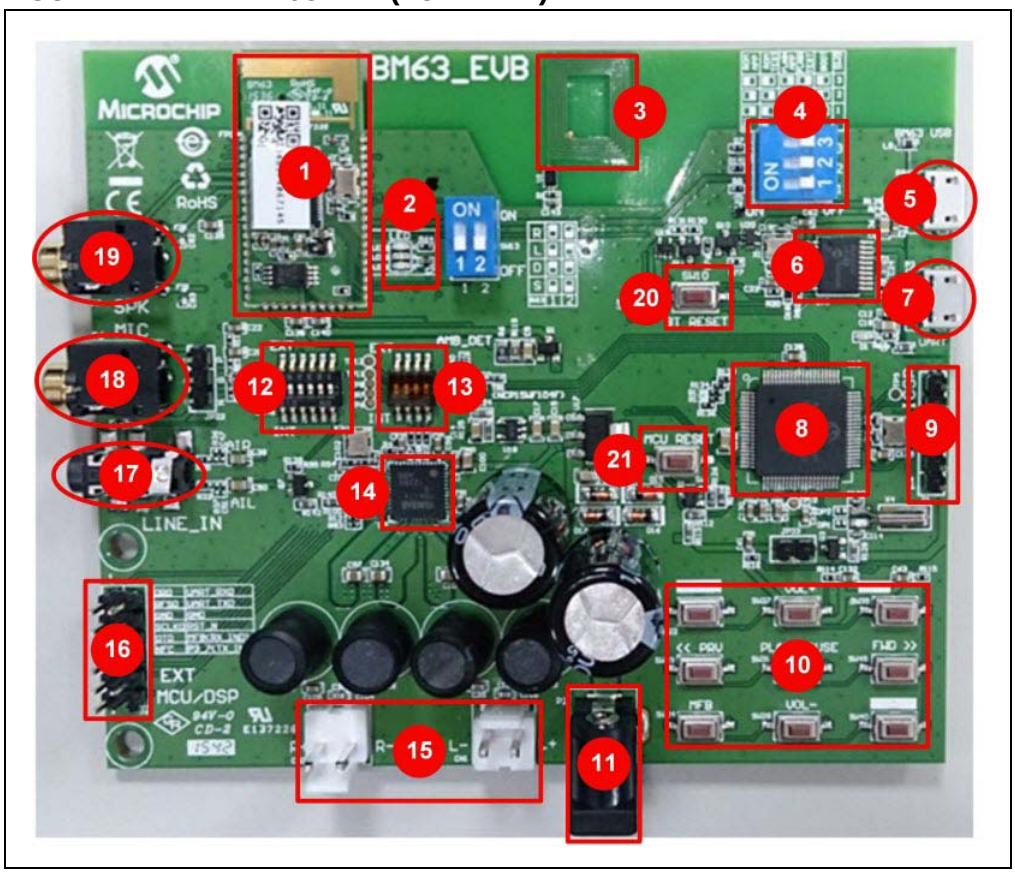
- The BM63 EVB includes a BM63 module, qualified for Bluetooth 4.2 specifications
- On-board MCU (PIC18F85J10) and DSP (YDA174) for easy operation and feature demonstration
- On-board keypad matrix that is controlled by MCU, which makes it easy for play-back control
- Built-in Near Field Communication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

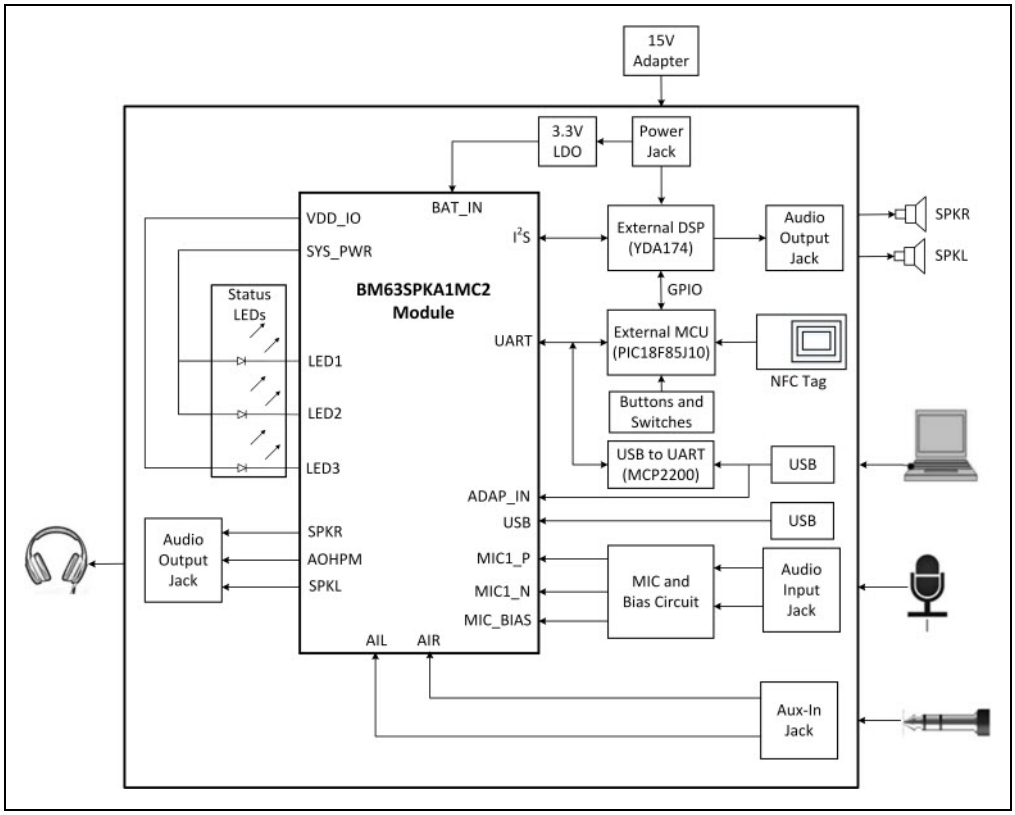
FIGURE 1-2: BM63 EVB (TOP VIEW)



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.

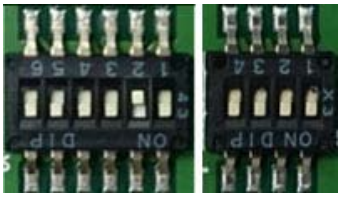
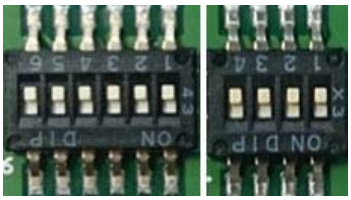
TABLE 2-1: SWITCH SW9 DETAILS

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

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.

TABLE 2-2: SWITCH SW46/SW47 DETAILS

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 (MFB) SW47 1: OFF (DT0) 2: OFF (SCLK0) 3: OFF (RFS0) 4: OFF (NC)

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

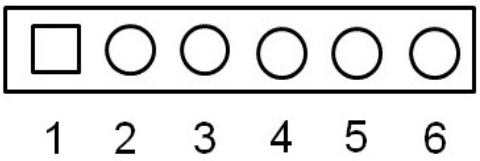


TABLE 2-3: ICSP HEADER J5

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

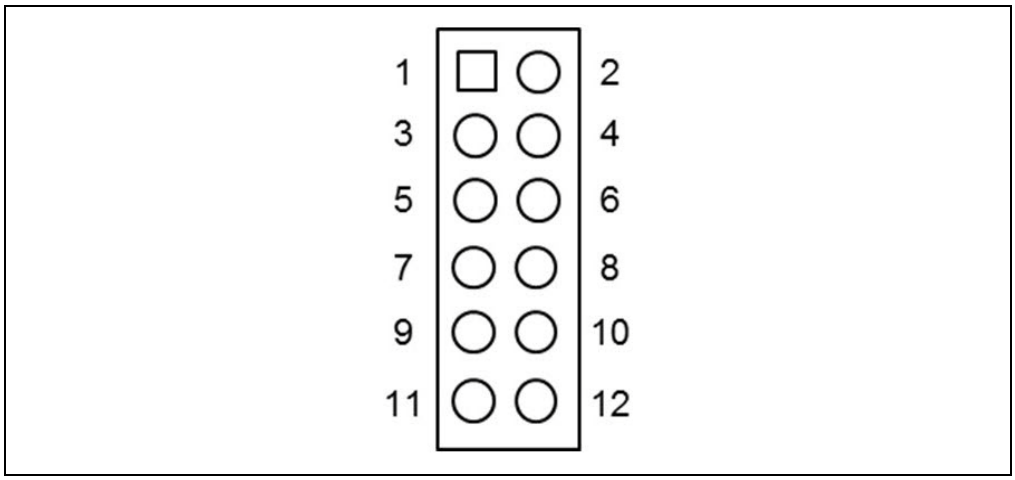


TABLE 2-4: EXTERNAL MCU/DSP HEADER J6

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

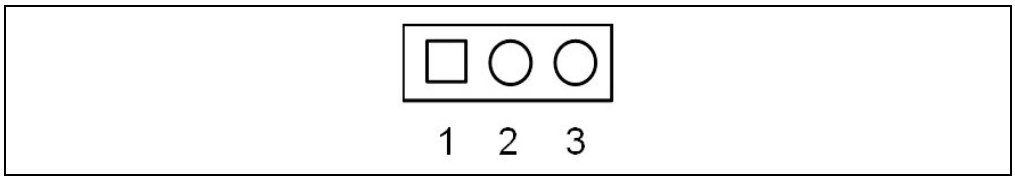


TABLE 2-5: MIC HEADER JP23

Part Number	Pin	Description
JP23	1	MIC_P1
	2	AGND
	3	MIC_N1

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

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:

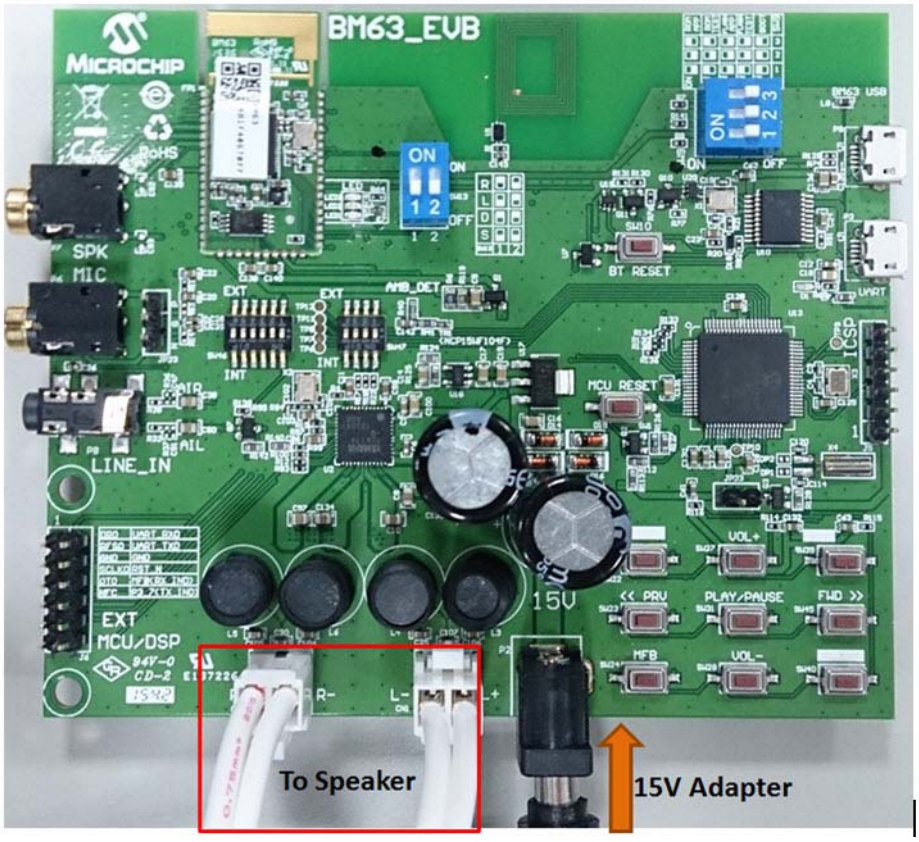
1. Set switch SW9 to Flash Application mode, see Figure 3-1.

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.

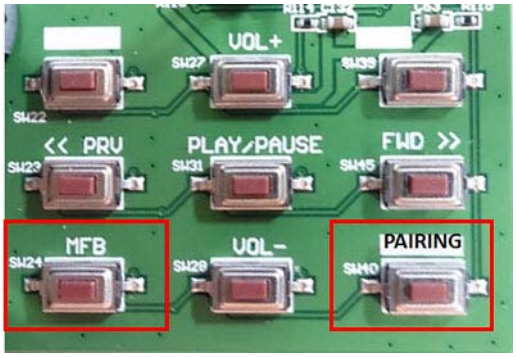
Note: Do not plug-in the USB cable.

FIGURE 3-2: USING EVALUATION BOARD



4. 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



6. 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.

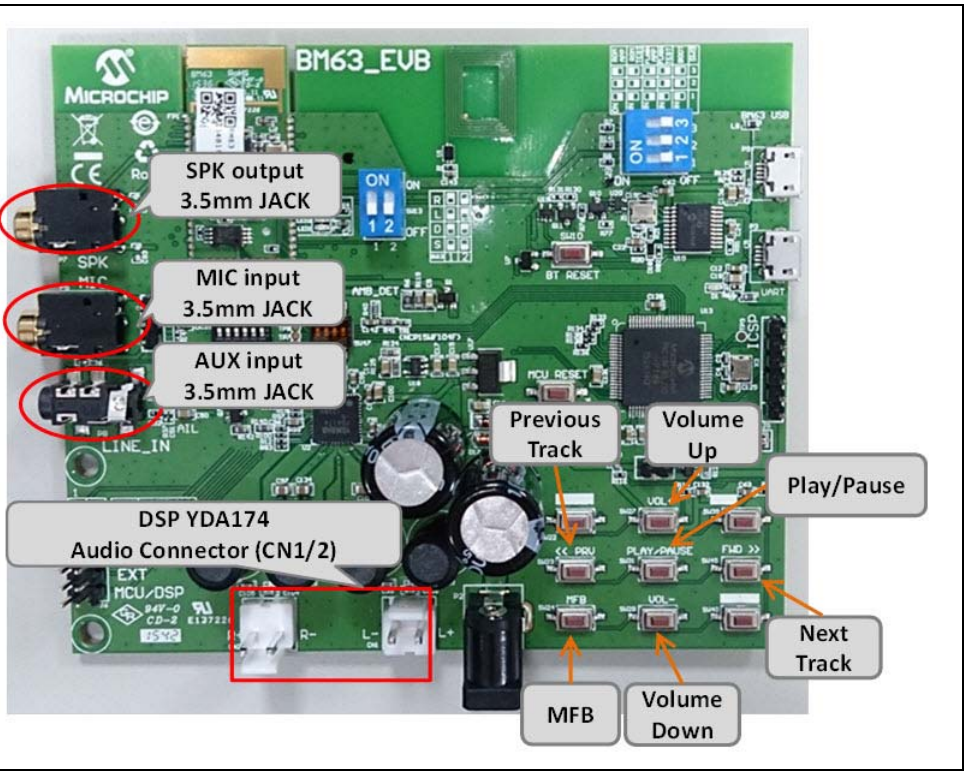
3.3 APPLICATION DEMONSTRATION

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.

1. Establish the connection between the BM63 EVB and a host device, refer to **3.2 “Getting Started with BM63 EVB”**.
2. 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 micro-phone 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

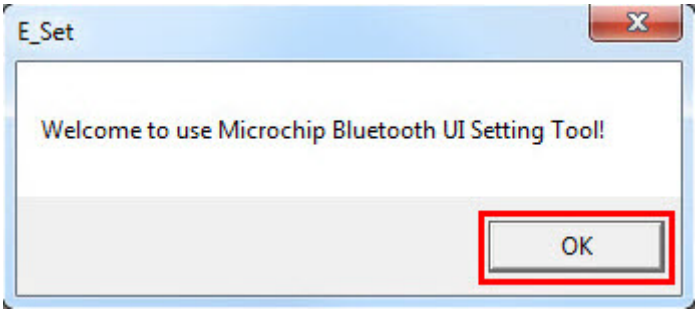
3.4.1 UI Tool Configuration

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.

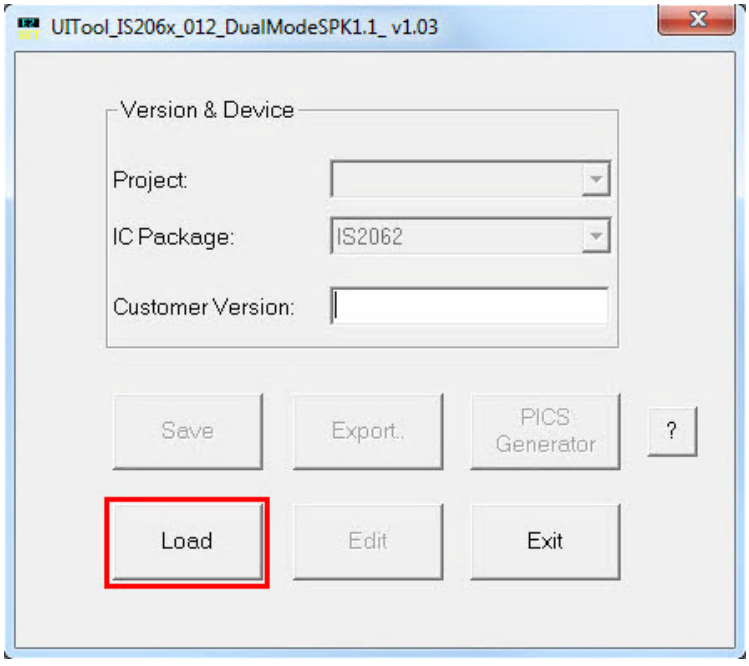
> **Note:** Download and install the UI tool, which is available on the Microchip web site: www.microchip.com/BM63. For this demonstration UITool_IS206x_012_DualModeSPK1.1_v1.03 is used.

FIGURE 3-5: UI TOOL



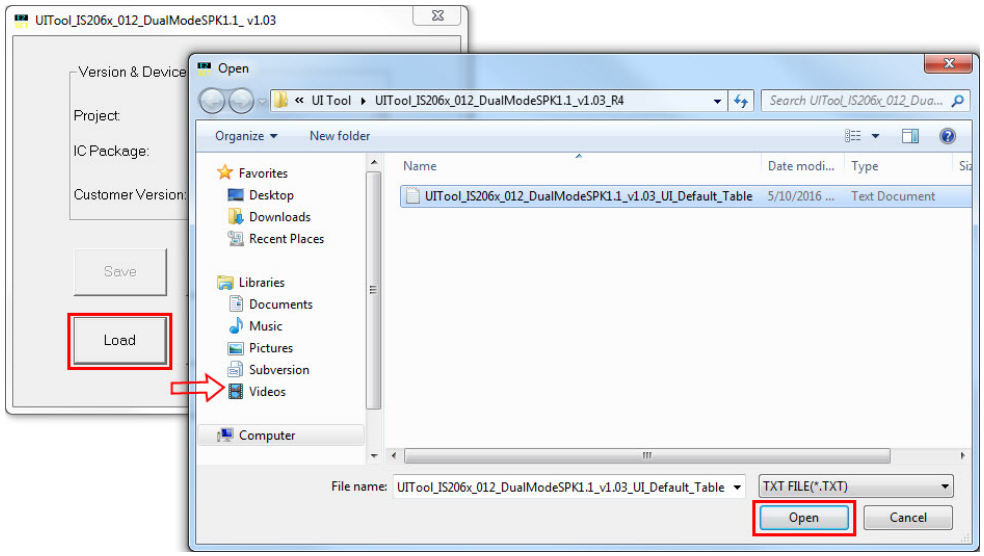
2. In the UI configuration tool, click **Load**, see Figure 3-6.

FIGURE 3-6: UI CONFIGURATION TOOL



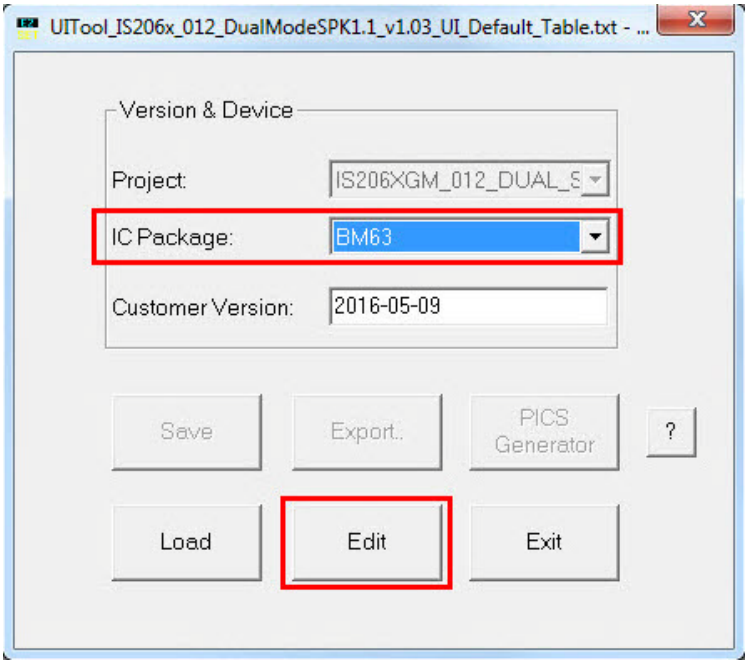
3. From the Open window, select the default UI parameter text file (provided with the UI tool) for the BM63 module, and then click **Open**, see Figure 3-7.

FIGURE 3-7: LOADING DEFAULT UI PARAMETERS



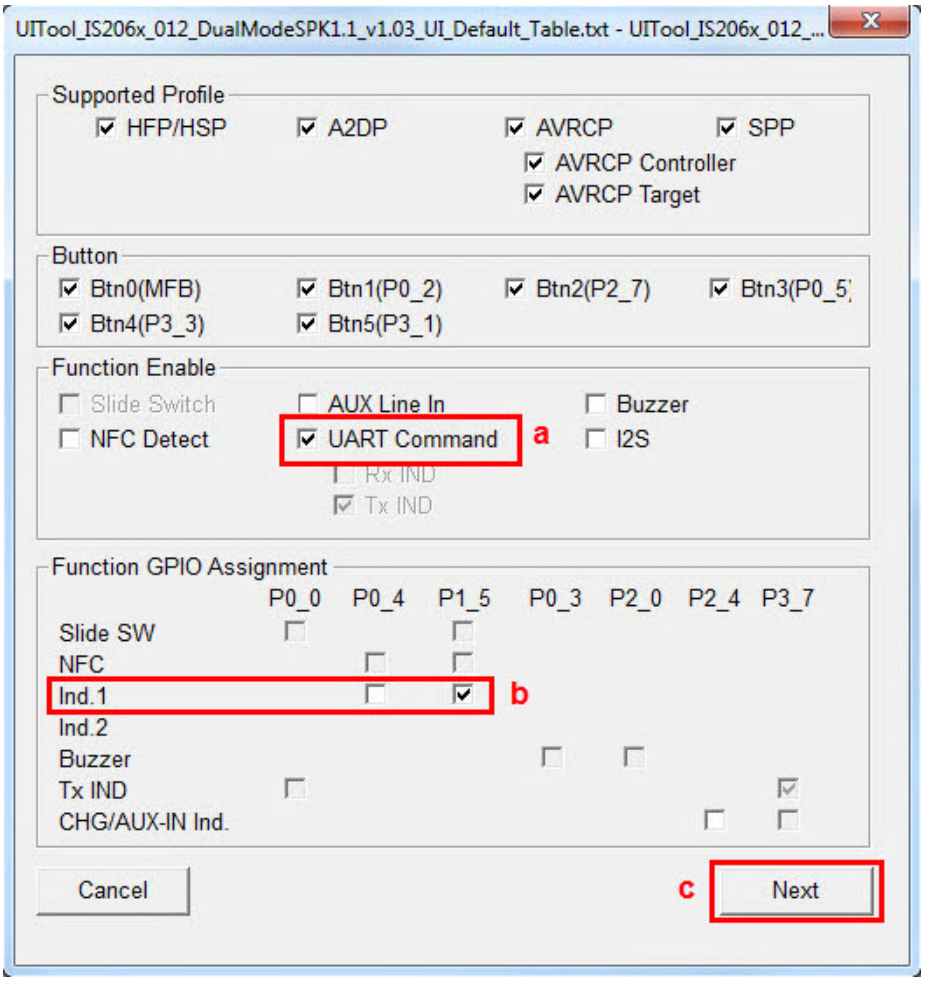
4. After loading the UI parameters, select "BM63" from the **IC Package** drop-down list and then click **Edit**, see Figure 3-8.

FIGURE 3-8: EDIT UI PARAMETERS



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**.

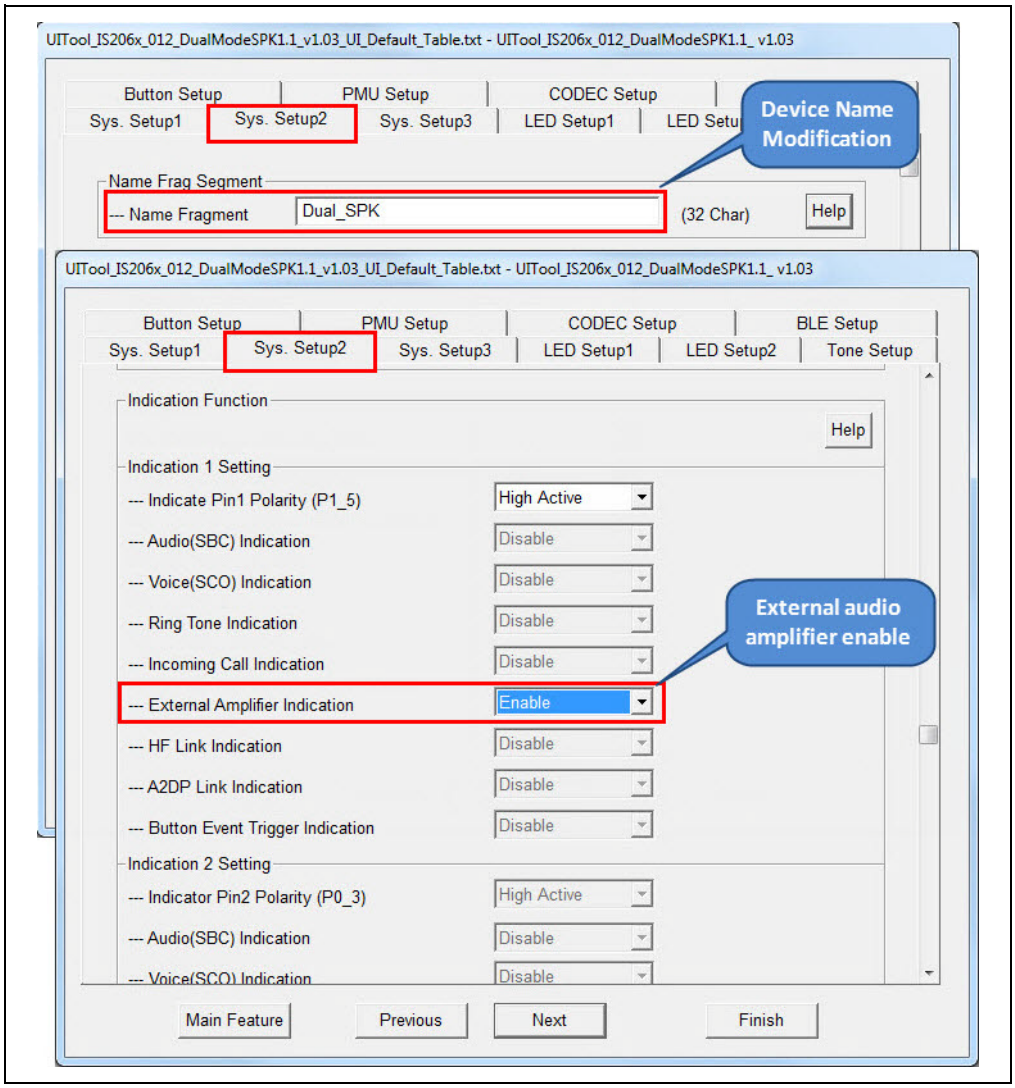
FIGURE 3-9: MAIN FEATURE SETTINGS



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

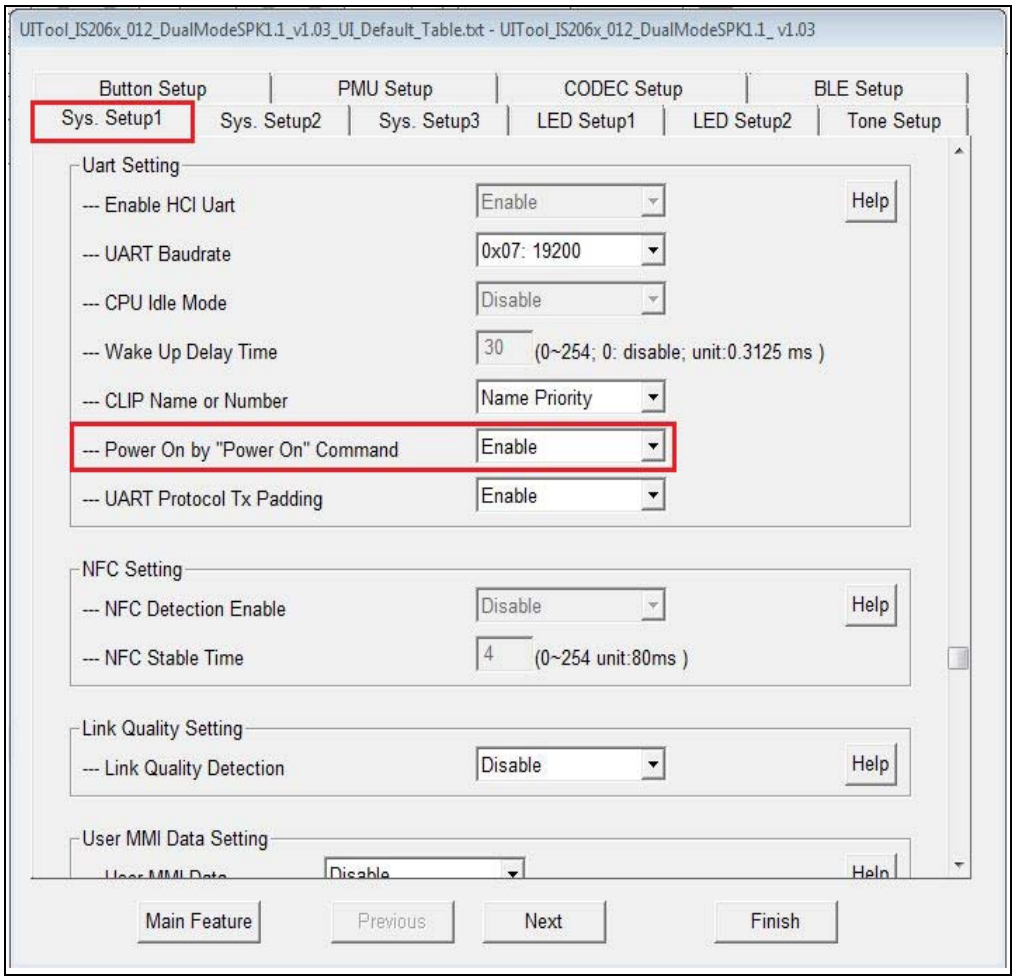
6. The System and Functional Settings dialog with various options (tabs) is displayed to configure the parameters. In the **Sys. Setup2** tab, from Indication 1 Setting section, enable **External Amplifier Indication**, as illustrated in Figure 3-10. Click **Help** to get more detailed information.

FIGURE 3-10: ENABLE EXTERNAL AMPLIFIER INDICATION



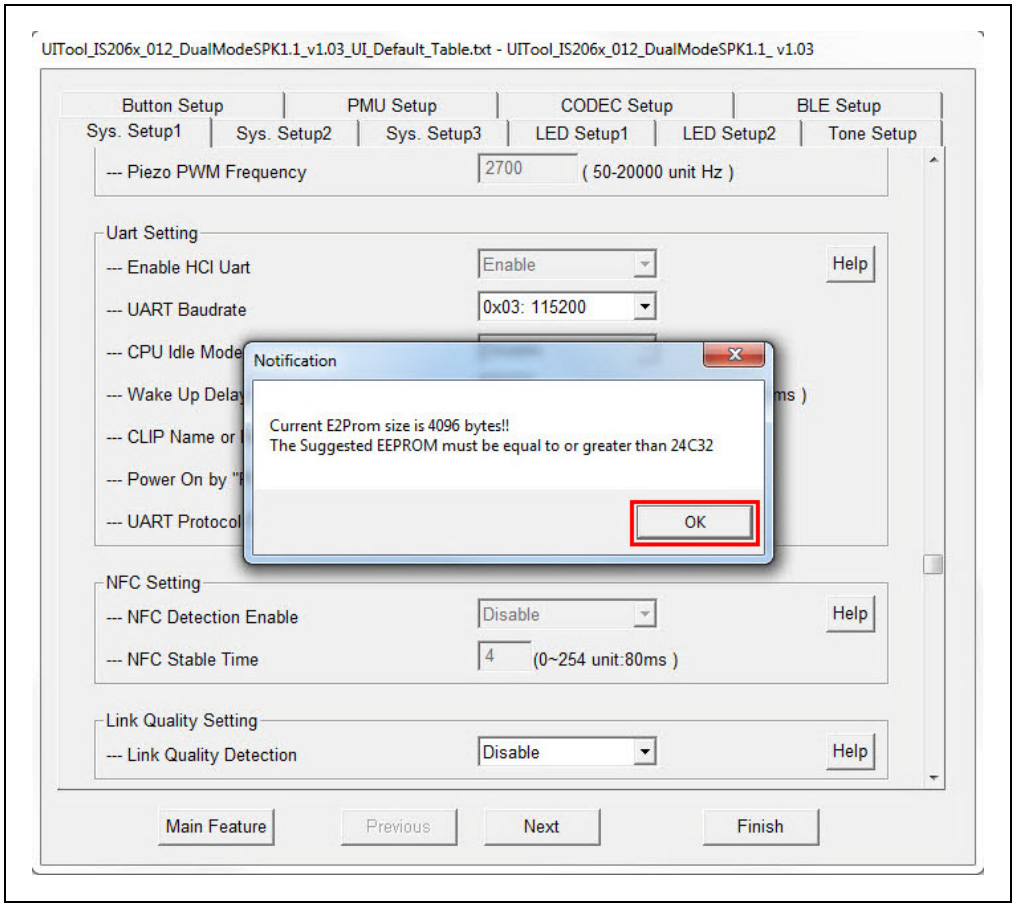
7. In **Sys. Setup1** tab, from the UART Setting section, enable **Power On by "Power On" Command**, see Figure 3-11. The module will power-on by UART command and not by the MFB key.

FIGURE 3-11: UART COMMAND SETTING



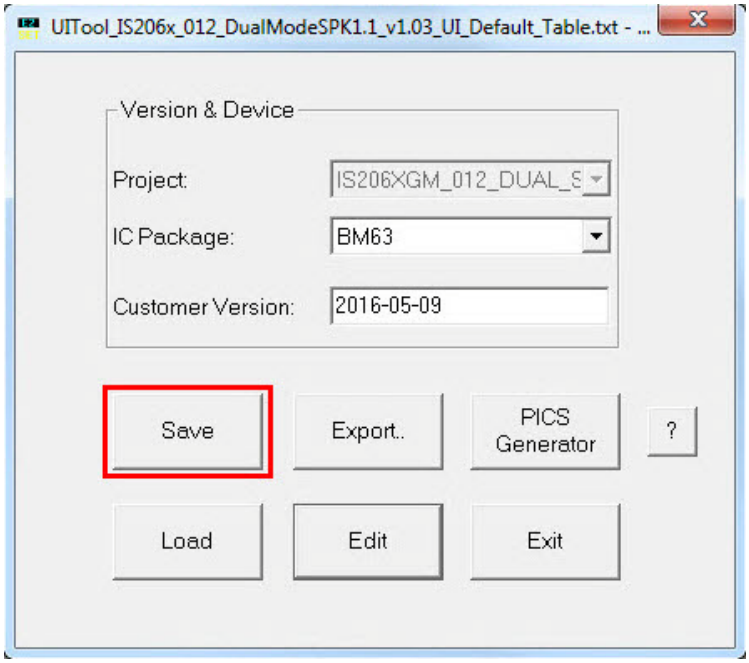
8. After setting up the parameters, click **Finish**. A notification is displayed to check the EEPROM size on the system. Click **OK**, see Figure 3-12.

FIGURE 3-12: EEPROM NOTIFICATION



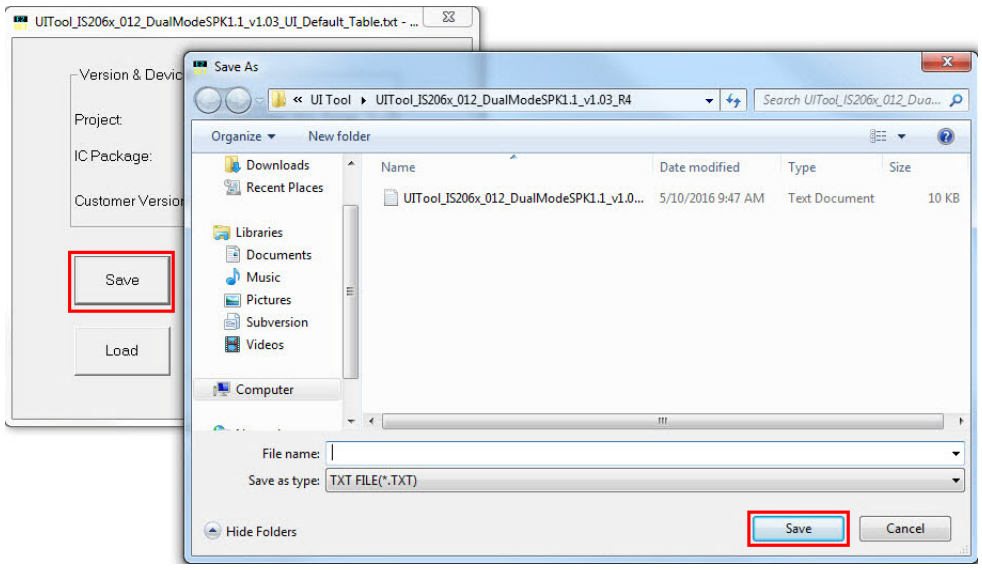
9. Click **Save** to save these UI parameters as a `.txt` file, see Figure 3-13.

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



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:

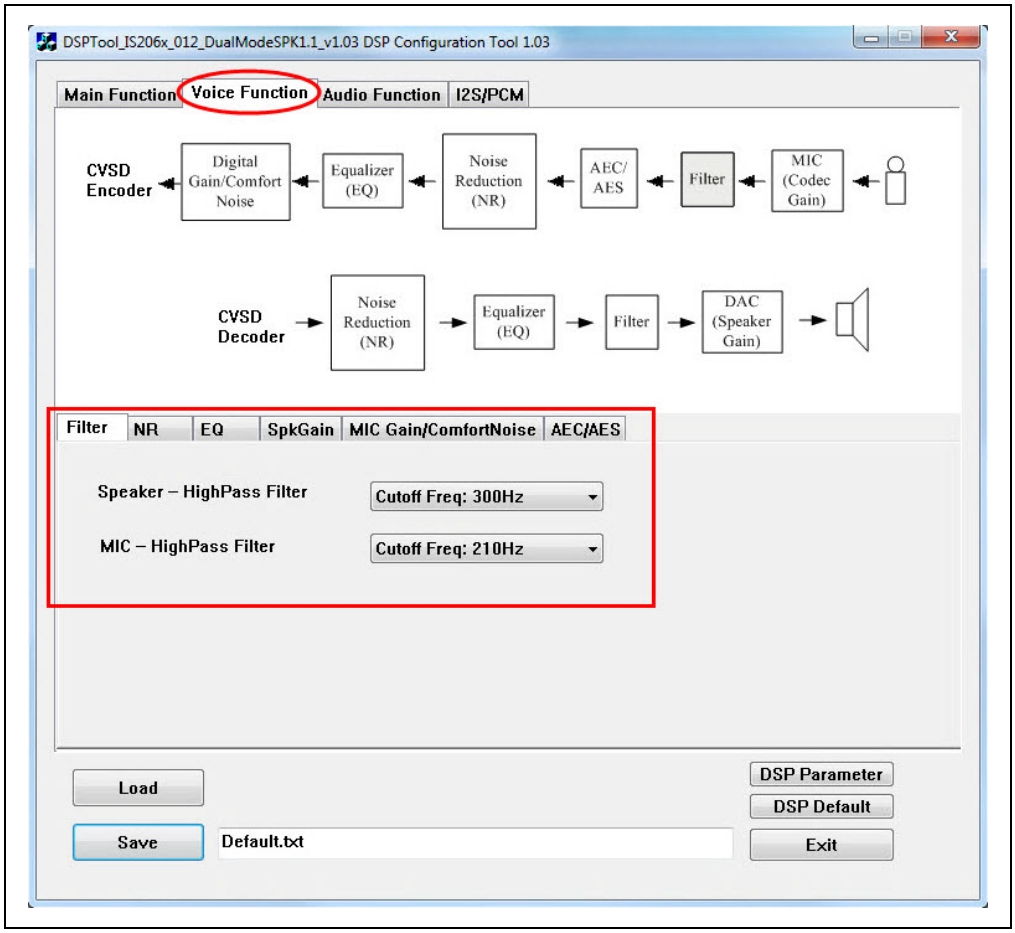
1. Open the DSP tool and a dialog displays with various options (tabs) to configure the parameters, see Figure 3-15.

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.

FIGURE 3-15: DSP TOOL SETTINGS

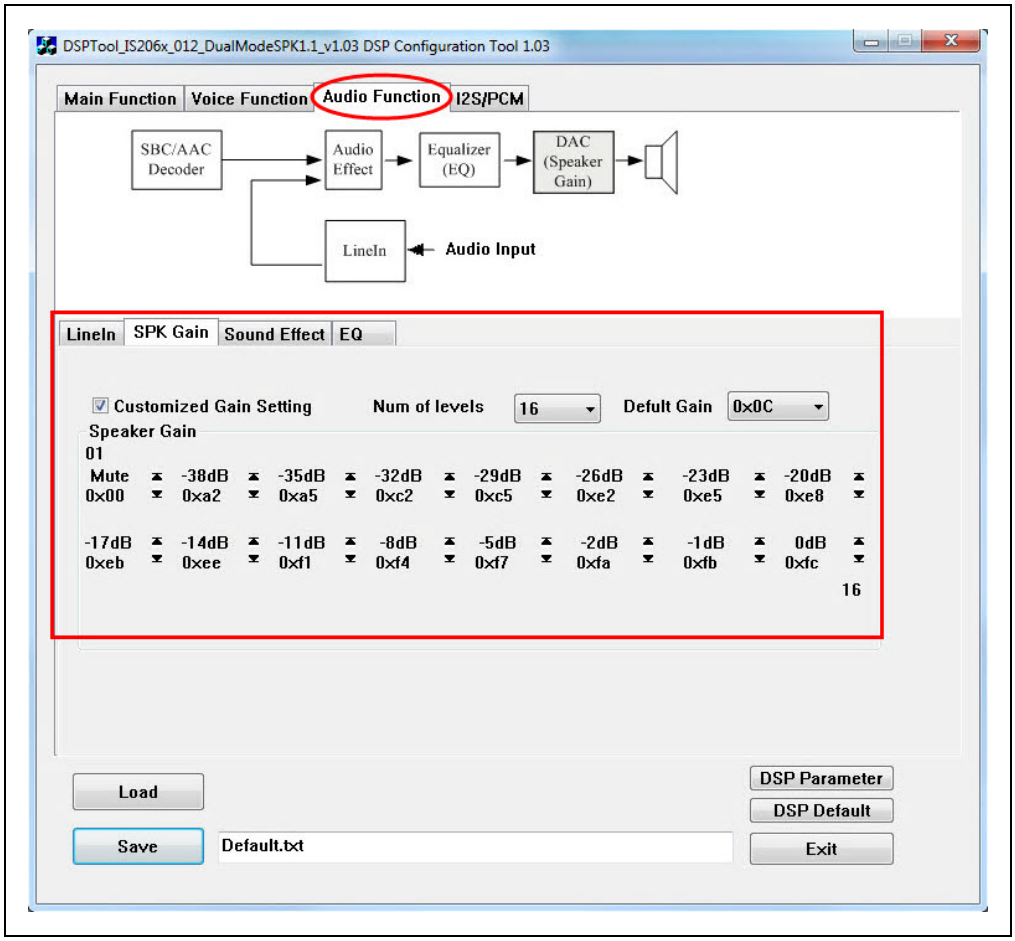
2. In the **Voice Function** tab, set the parameters as illustrated in Figure 3-16.

FIGURE 3-16: DSP VOICE FUNCTION SETTING



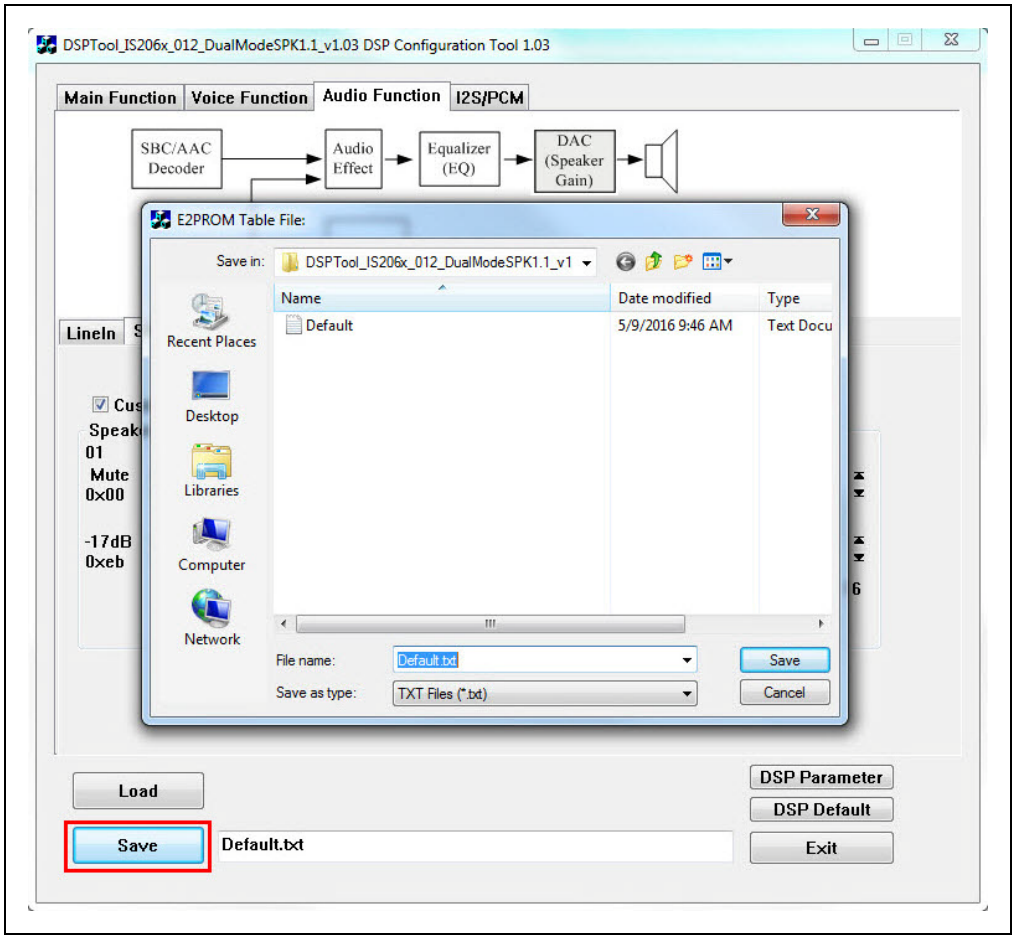
3. In the **Audio Function** tab, set the parameters as illustrated in Figure 3-17.

FIGURE 3-17: DSP AUDIO FUNCTION SETTING



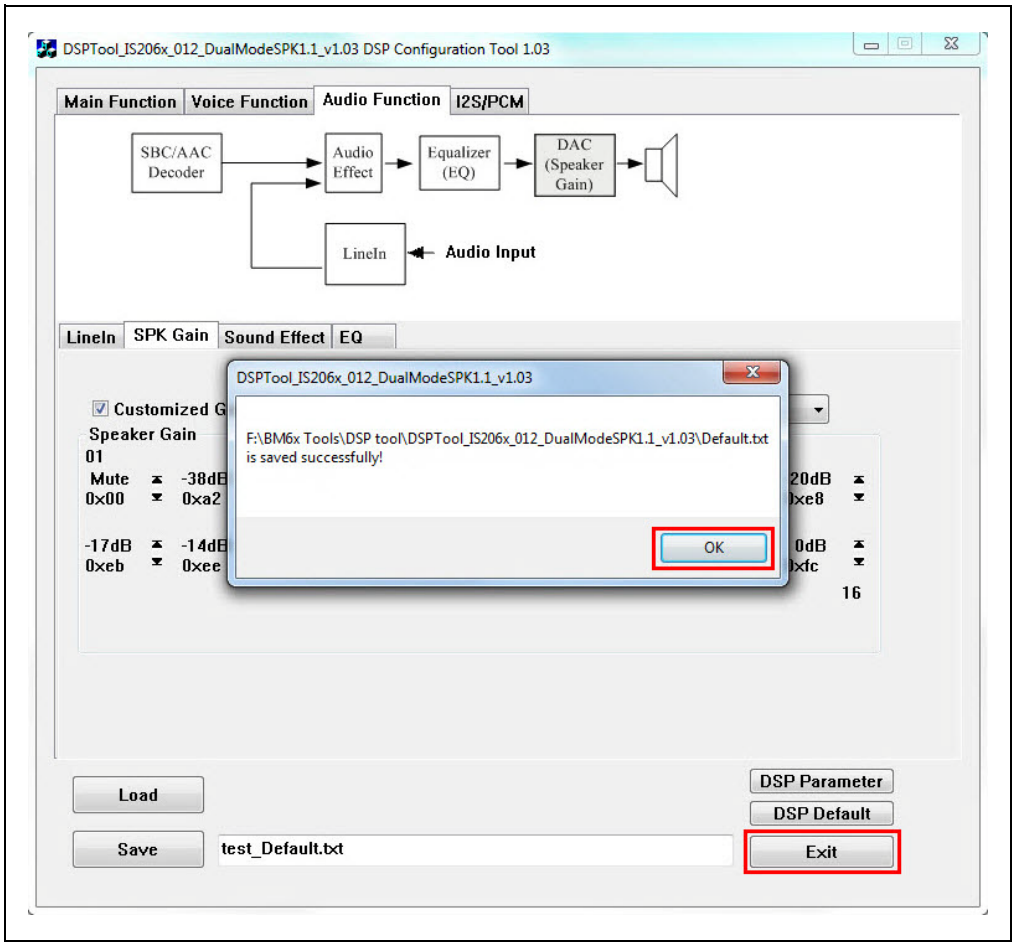
4. Click **Save** to save these DSP parameters as `.txt` file, see Figure 3-18.

FIGURE 3-18: SAVING DSP PARAMETERS



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.

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.

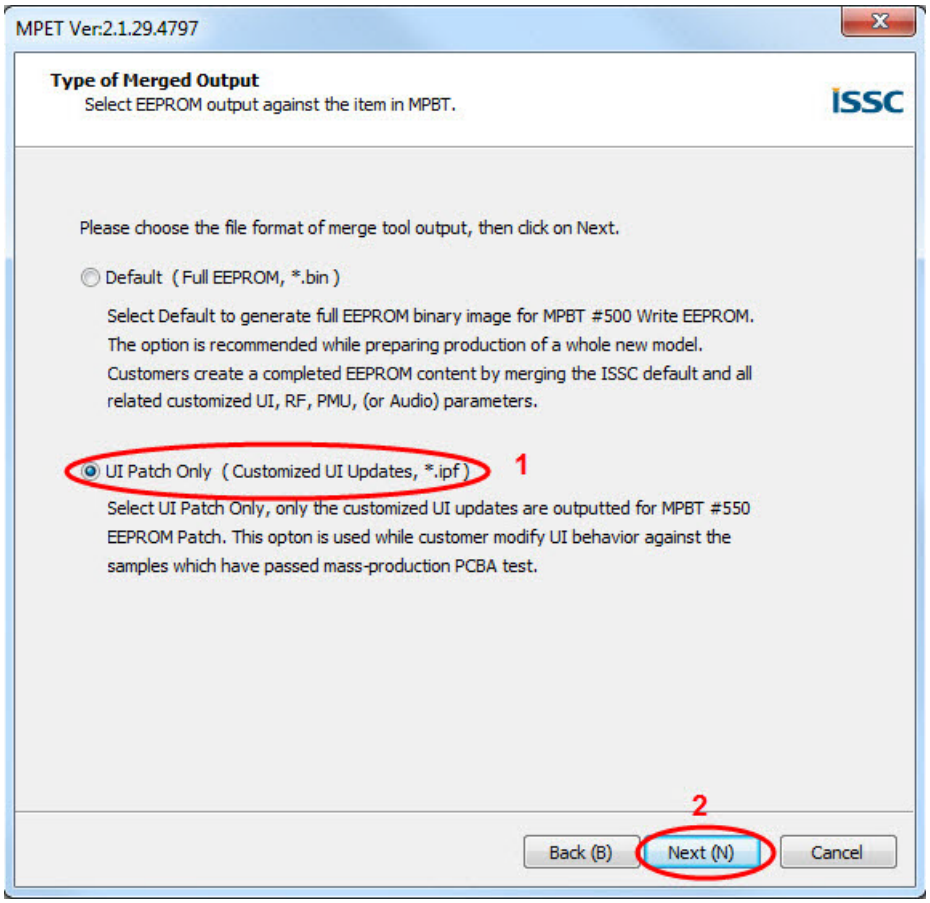
Note: Download and install the MPET tool, which is available on the Microchip web site: www.microchip.com/BM63. For this demonstration `MP_V2.1.29.4797` is used.

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.

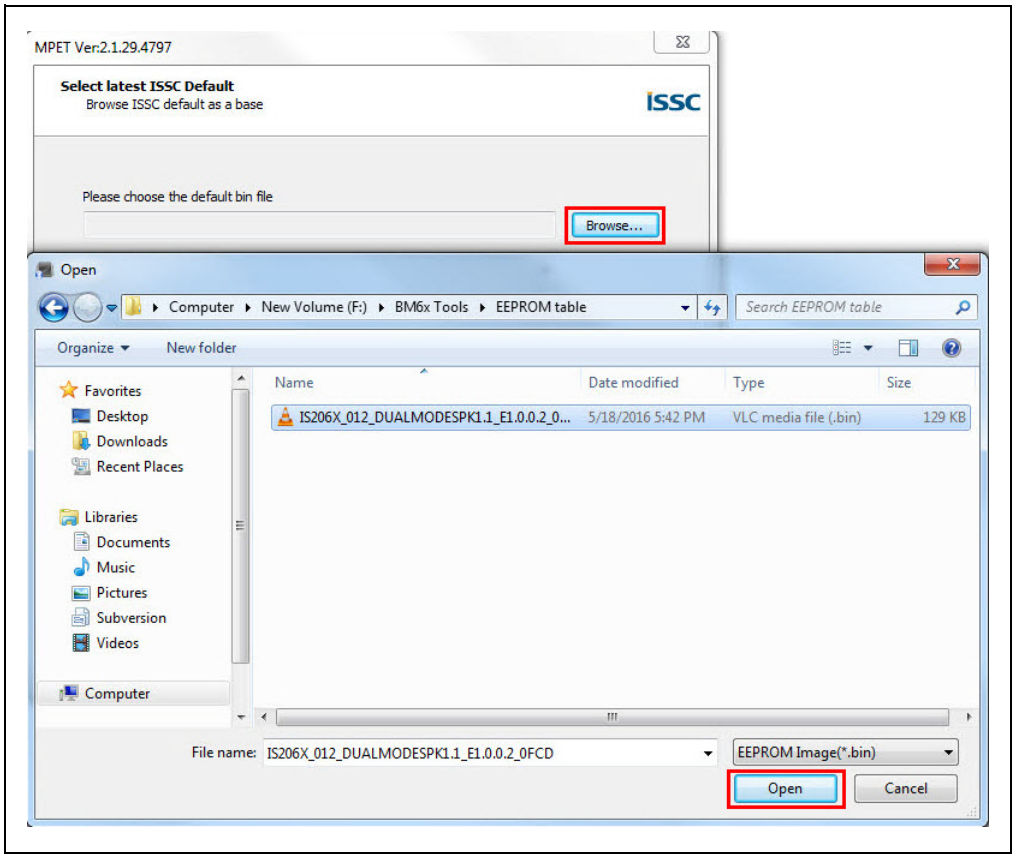
Note: For the UI parameter settings, refer to **3.4.1 "UI Tool Configuration"**, and for the DSP parameter settings, refer to **3.4.2 "DSP Tool Configuration"**.

FIGURE 3-21: MERGE UI AND DSP PARAMETERS



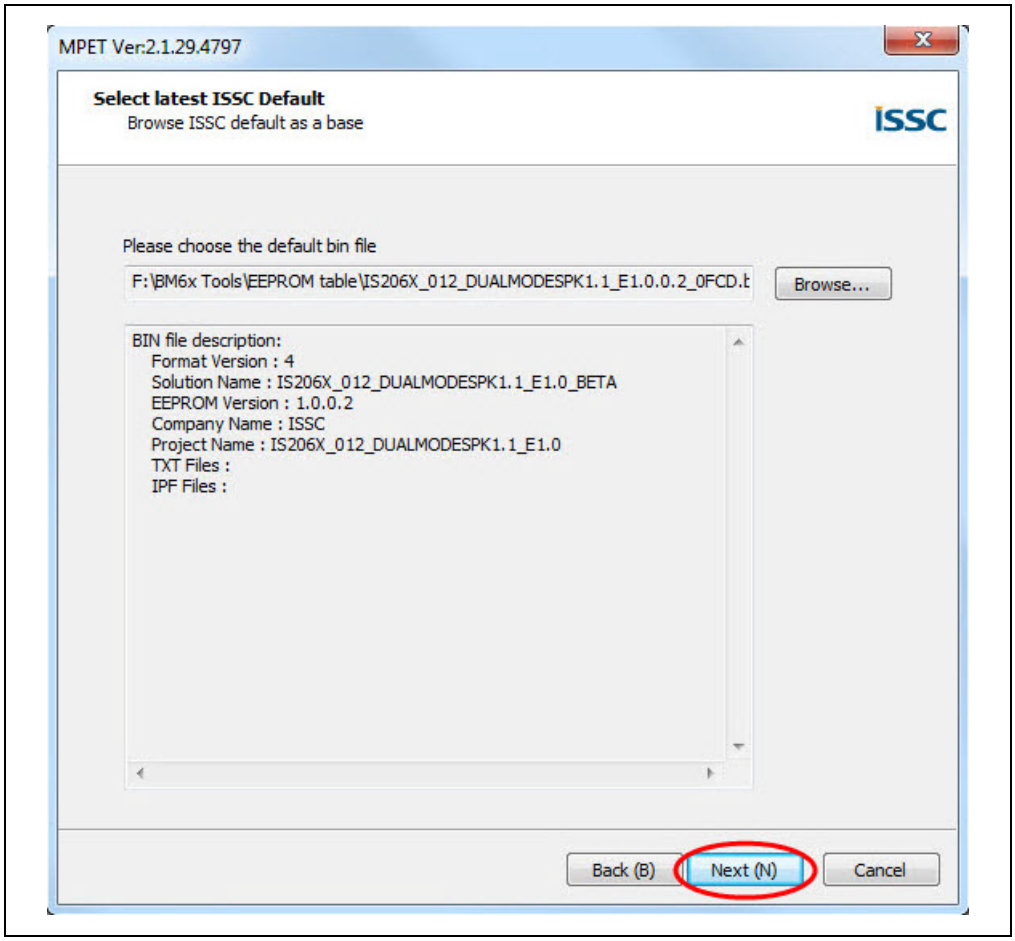
3. Click **Browse** to load the default `.bin` file (provided with the MPET tool). From the Open window, select the `.bin` file and then click **Open**, see Figure 3-22.

FIGURE 3-22: LOADING DEFAULT BIN FILE



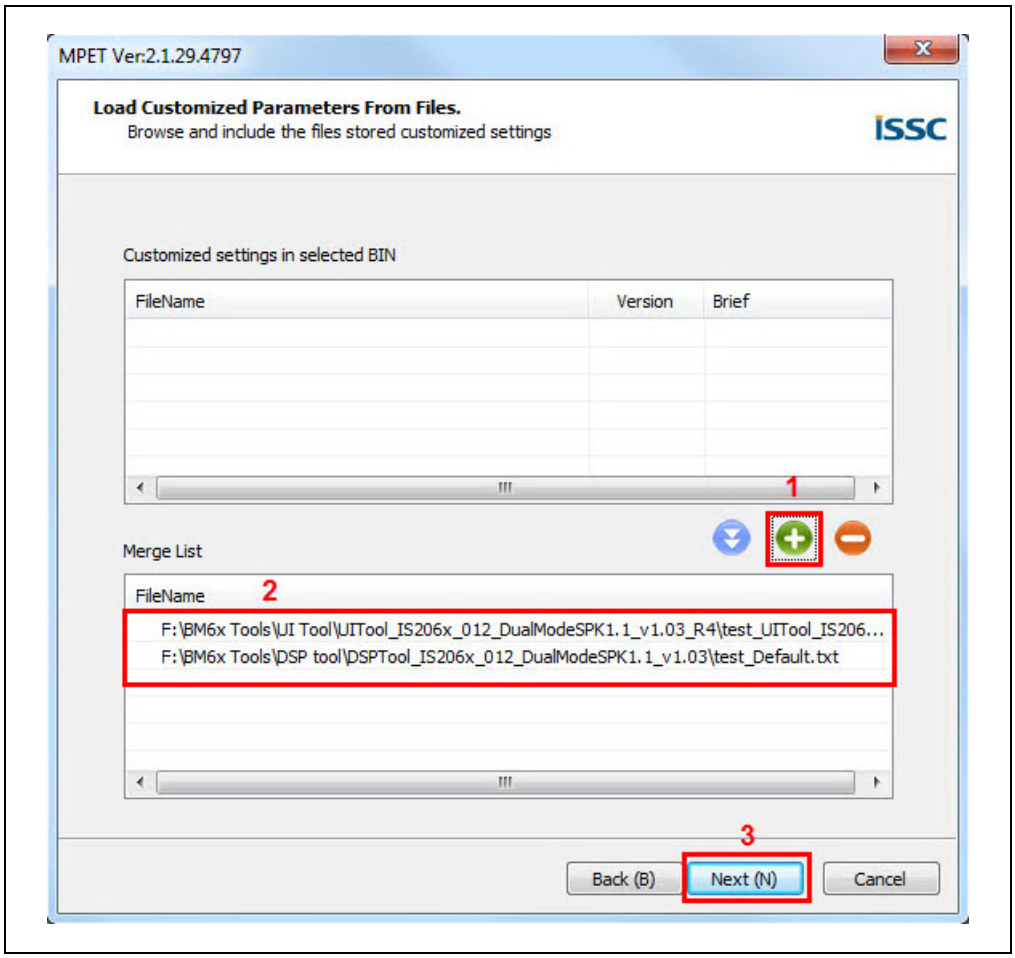
4. The bin file description is displayed, click **Next**, see Figure 3-23.

FIGURE 3-23: DEFAULT BIN FILE SETTING



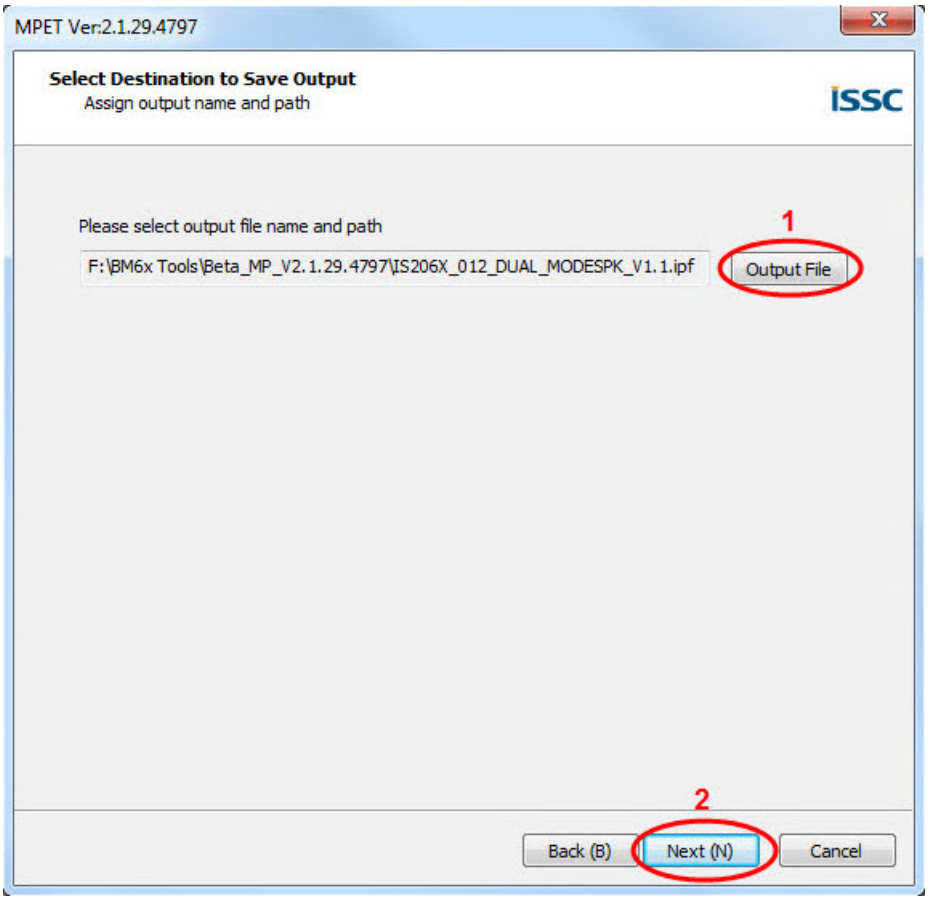
5. Click the "**+**" button to load the UI and the DSP parameters (`.txt` file) into the MPET tool to merge with the EEPROM table and then click **Next**, as illustrated in Figure 3-24.

FIGURE 3-24: CUSTOMIZED SETTINGS TO MERGE



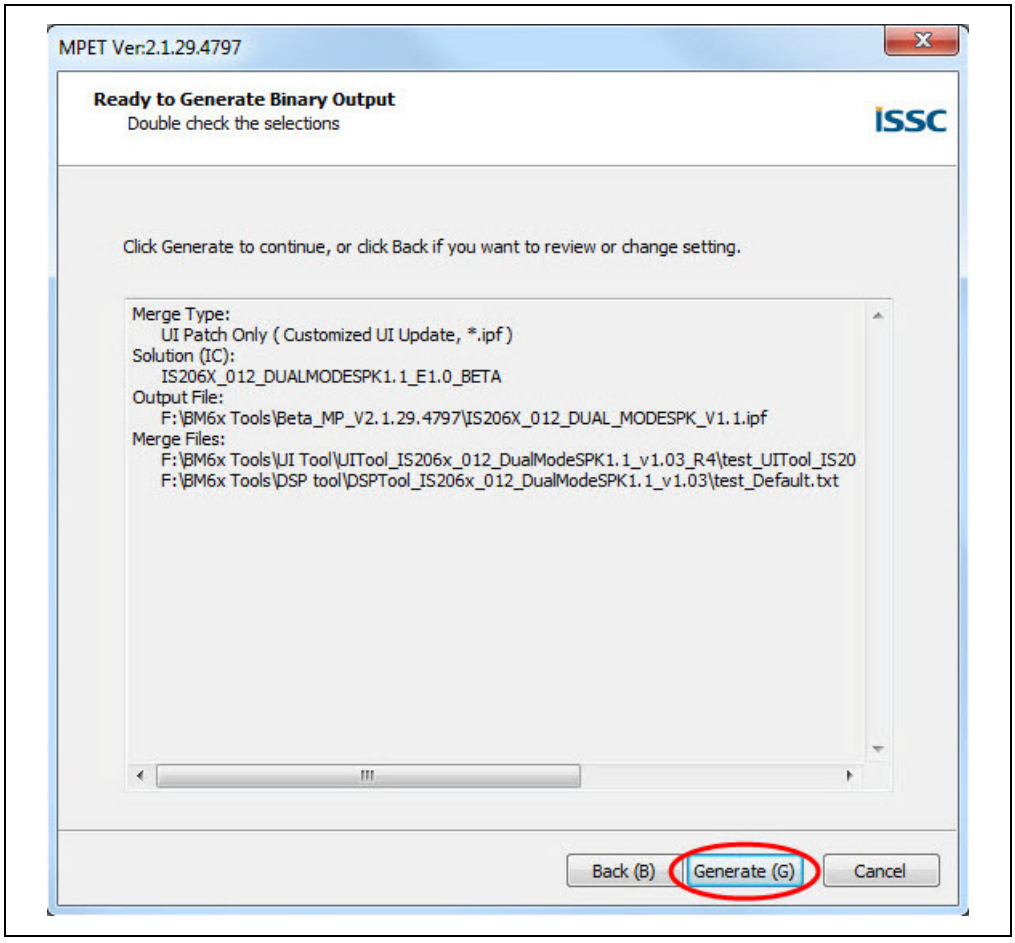
6. Select an output file path to create the merged EEPROM table (`.ipf` file), and then click **Next**, see Figure 3-25.

FIGURE 3-25: SELECTING OUTPUT FILE NAME AND PATH



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

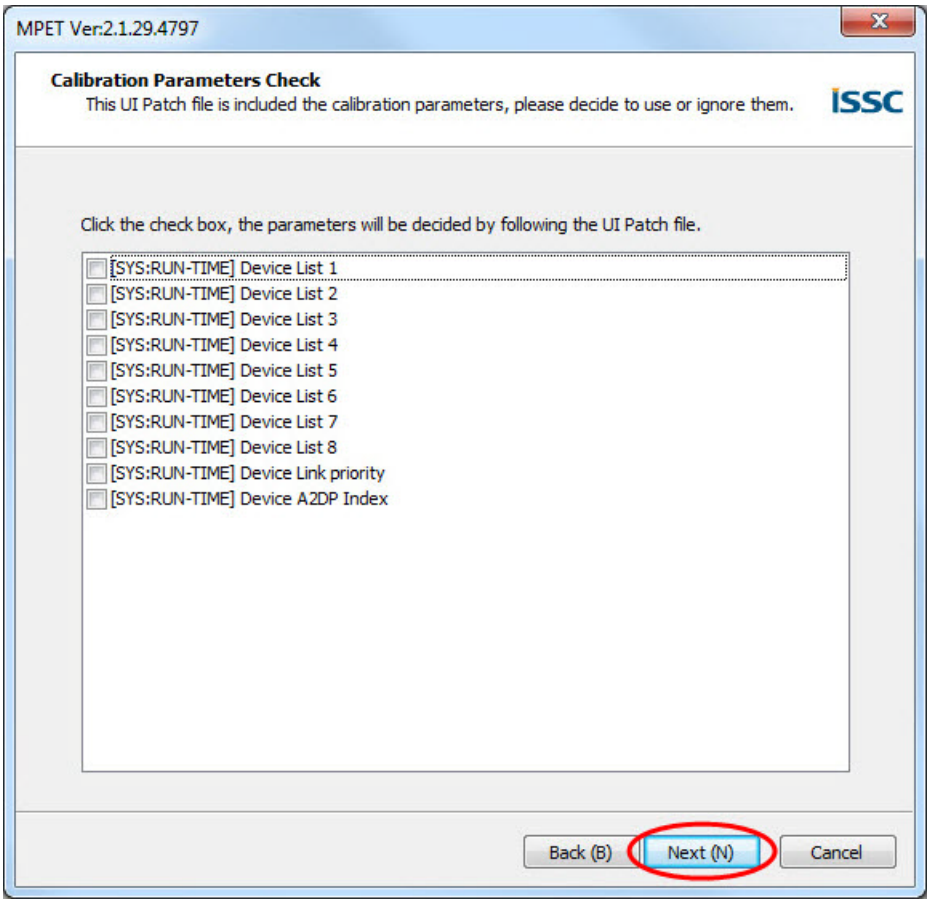
FIGURE 3-26: GENERATE EEPROM TABLE



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

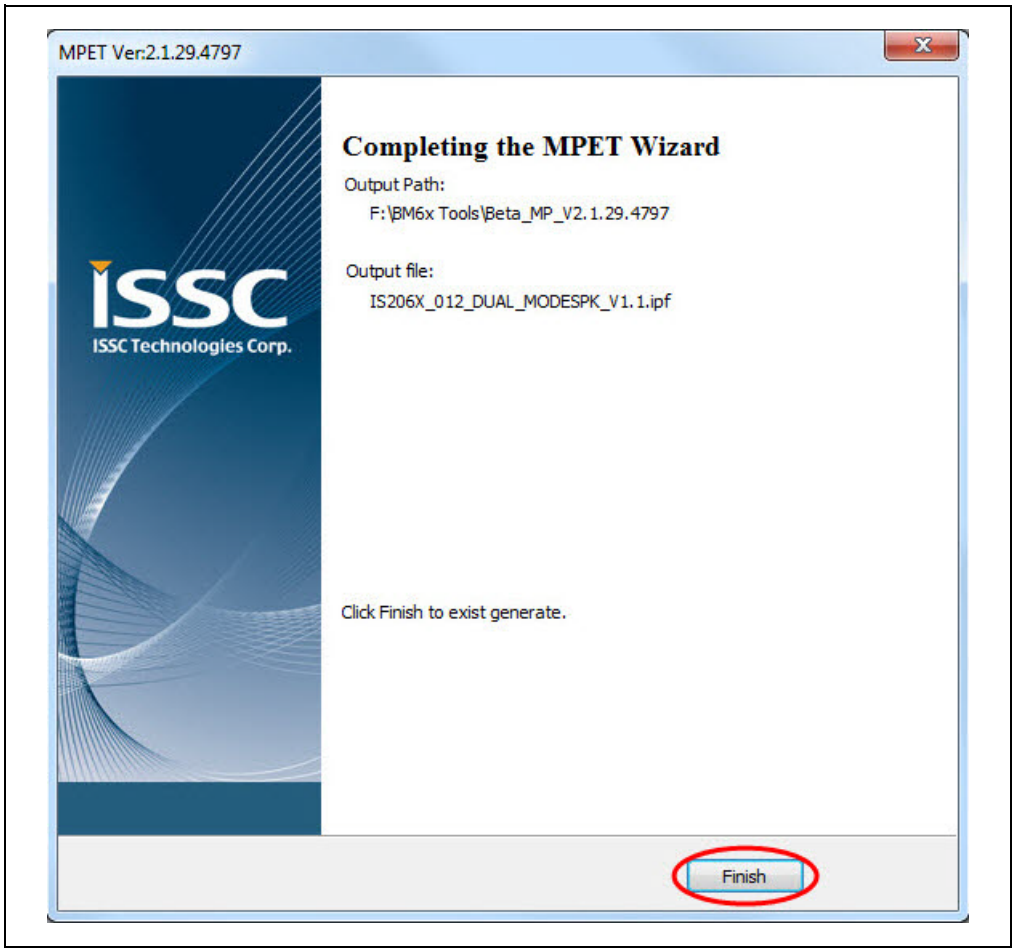
Note: If the items are selected, the calibration parameters of the `.ipf` file will over write the parameters in the device.

FIGURE 3-27: CALIBRATION PARAMETERS CHECK



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

FIGURE 3-28: MERGED EEPROM TABLE



3.5 UPDATING EEPROM PARAMETERS

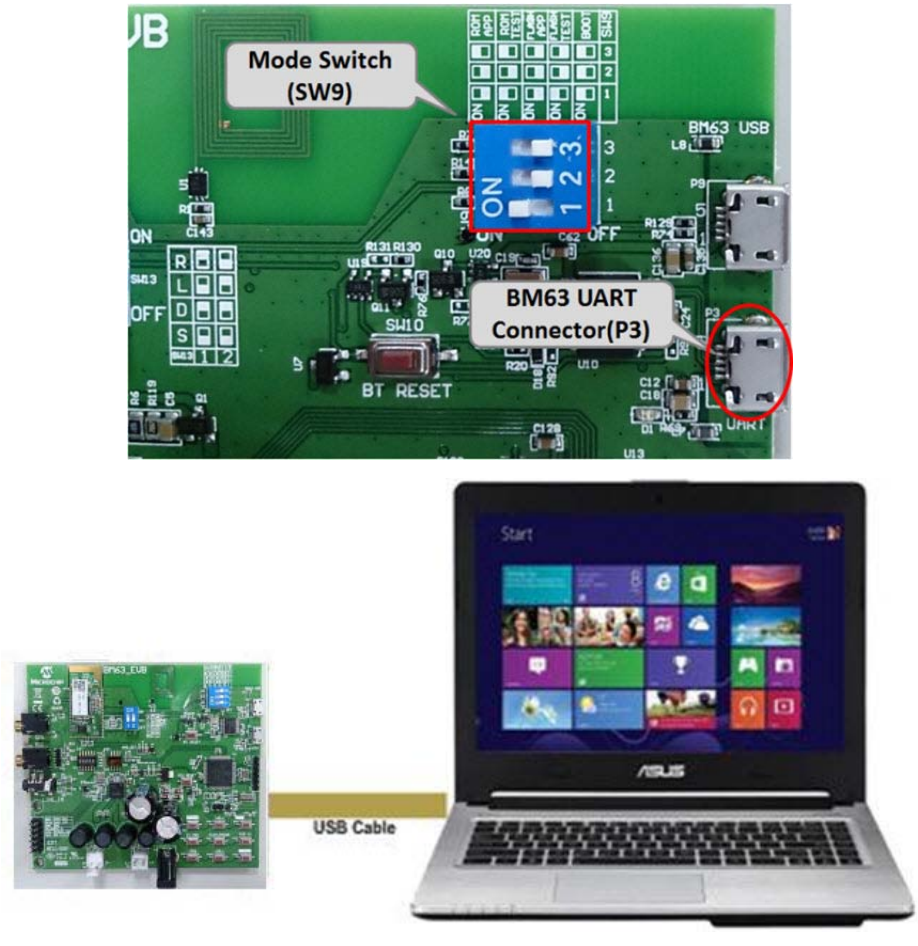
Perform the following actions to update the EEPROM parameters:

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

FIGURE 3-29: SWITCH SW9 IN TEST MODE

2. 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.

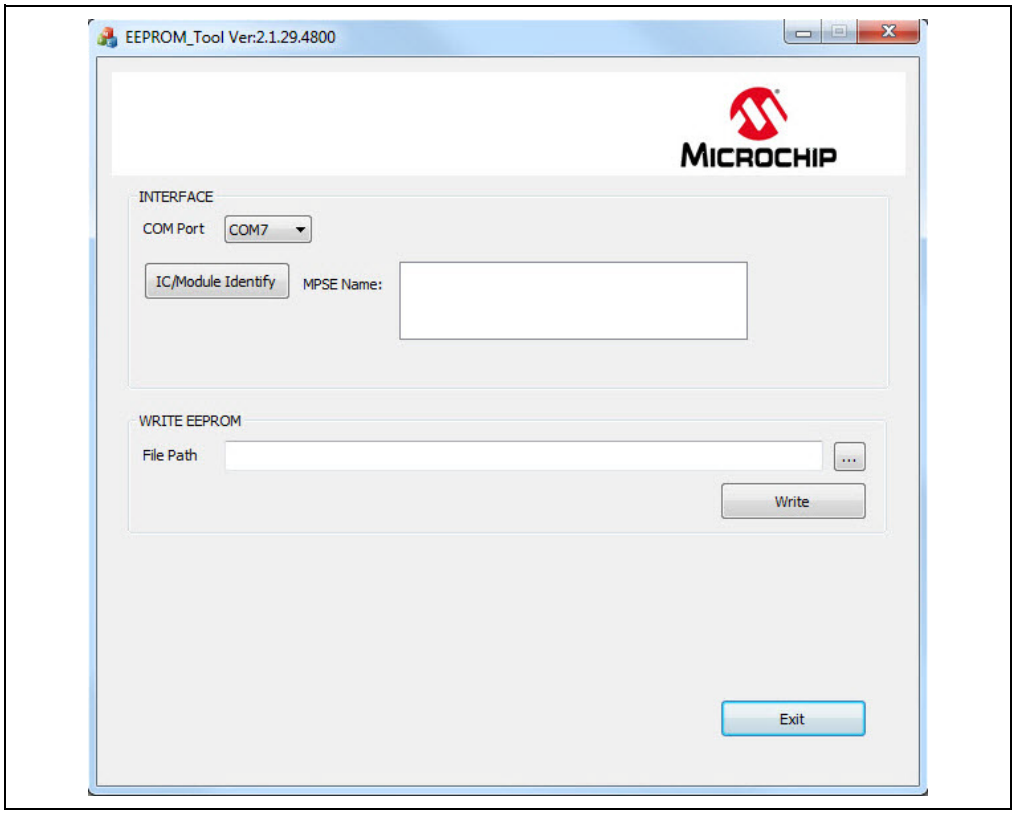
FIGURE 3-30: EEPROM PARAMETER SETUP



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.

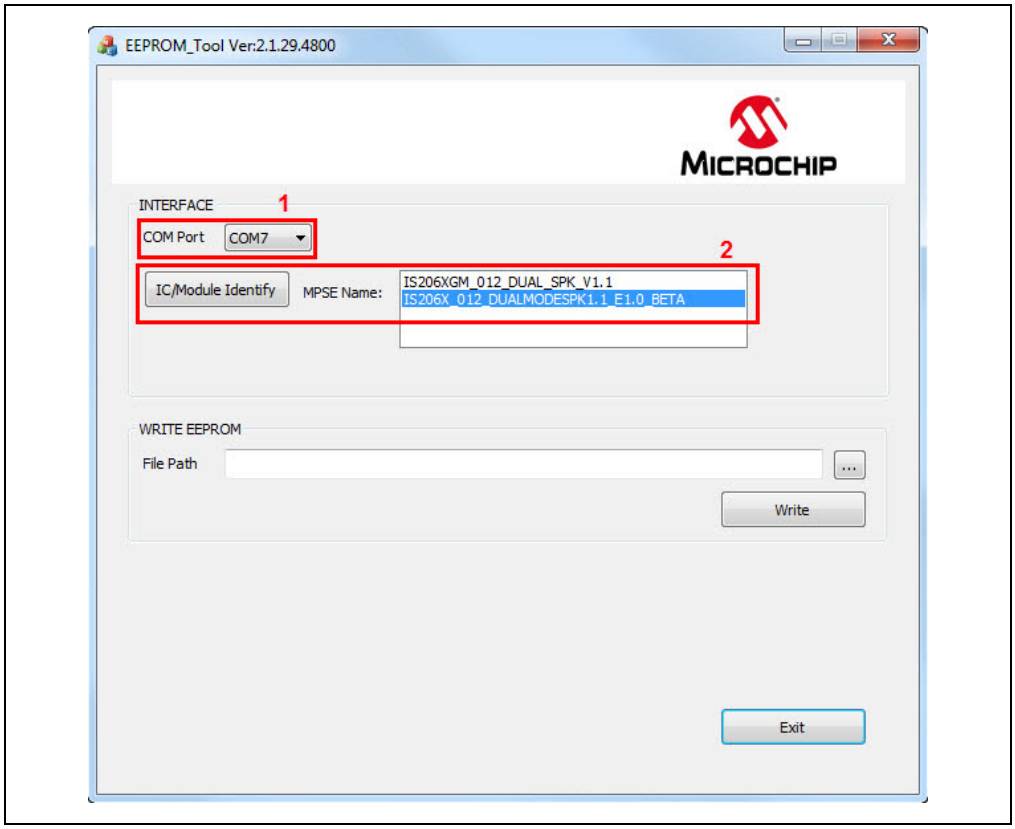
3. Open the EEPROM tool and a window displays, see Figure 3-31.

FIGURE 3-31: EEPROM TOOL



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

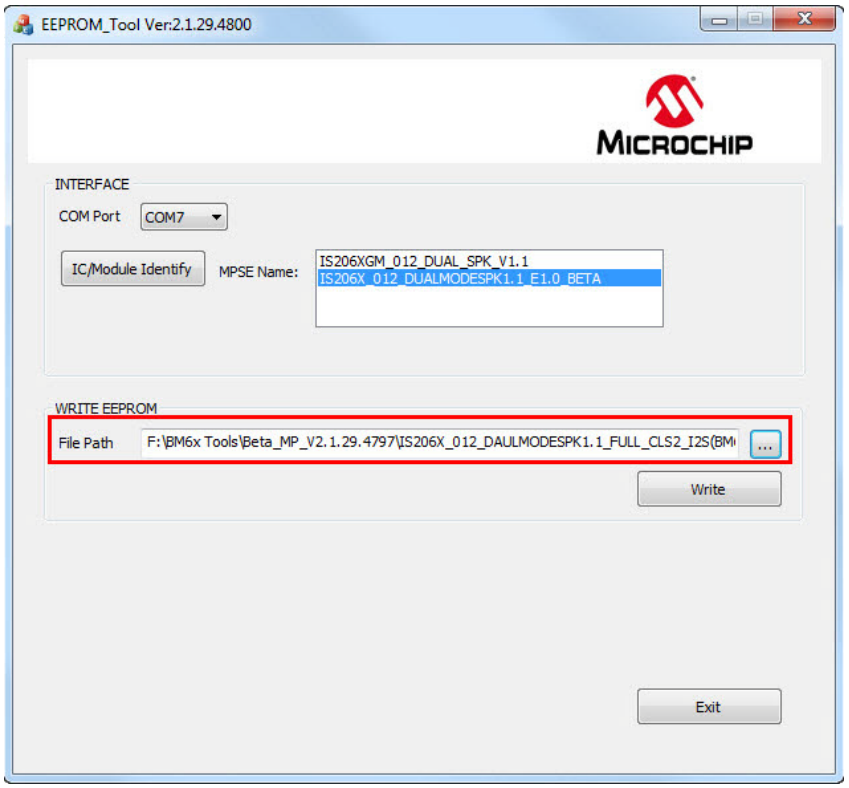
FIGURE 3-32: EEPROM TOOL SETTINGS



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.

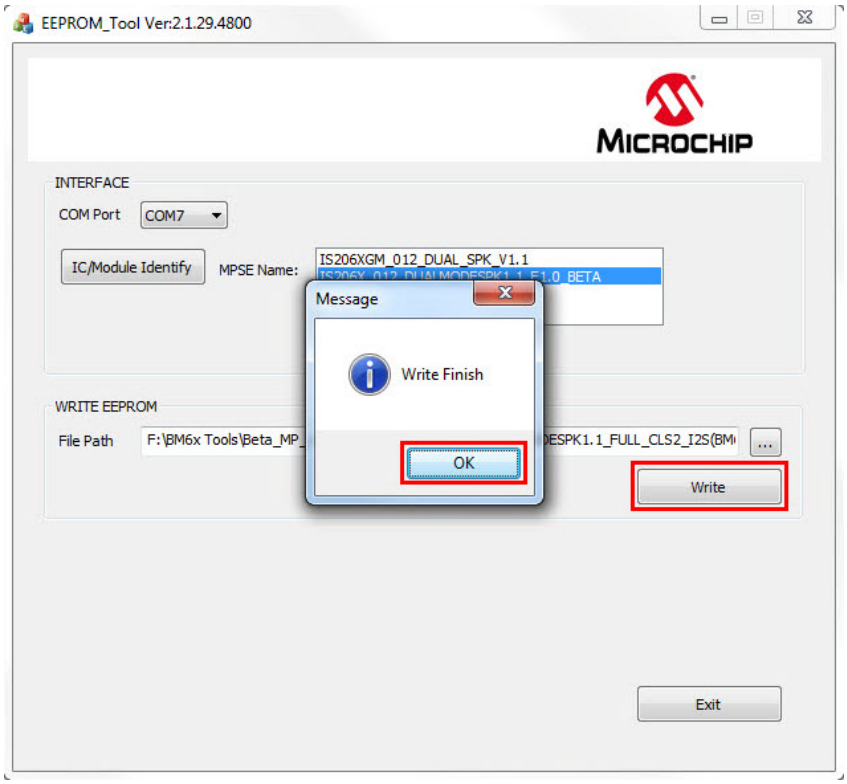
Note: The patch file (`.ipf`) is generated using the MPET tool. For information on generating the patch file, refer to **3.4.3 "MPET Tool Configuration"**.

FIGURE 3-33: LOADING GENERATED PATCH FILE



6. 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.

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

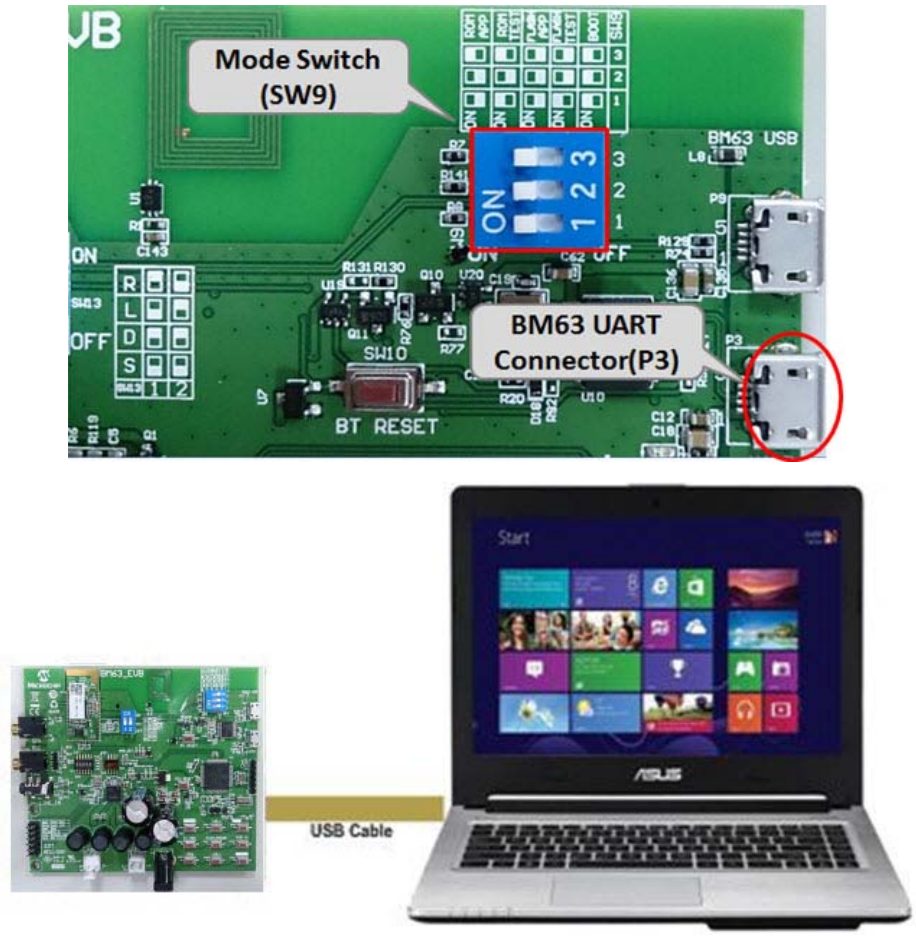
Flash programming is required to update the firmware with a newer version or a specific version. To update the flash code, perform the following actions:

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

FIGURE 3-36: SWITCH SW9 IN WRITE FLASH MODE

2. 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.

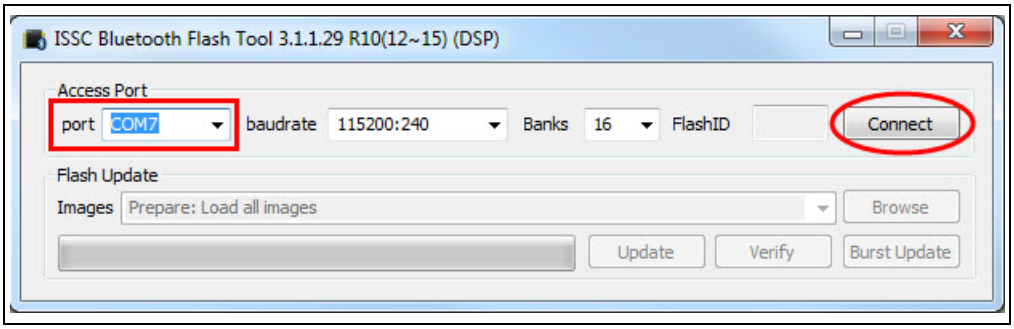
FIGURE 3-37: FLASH CODE SETUP



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.

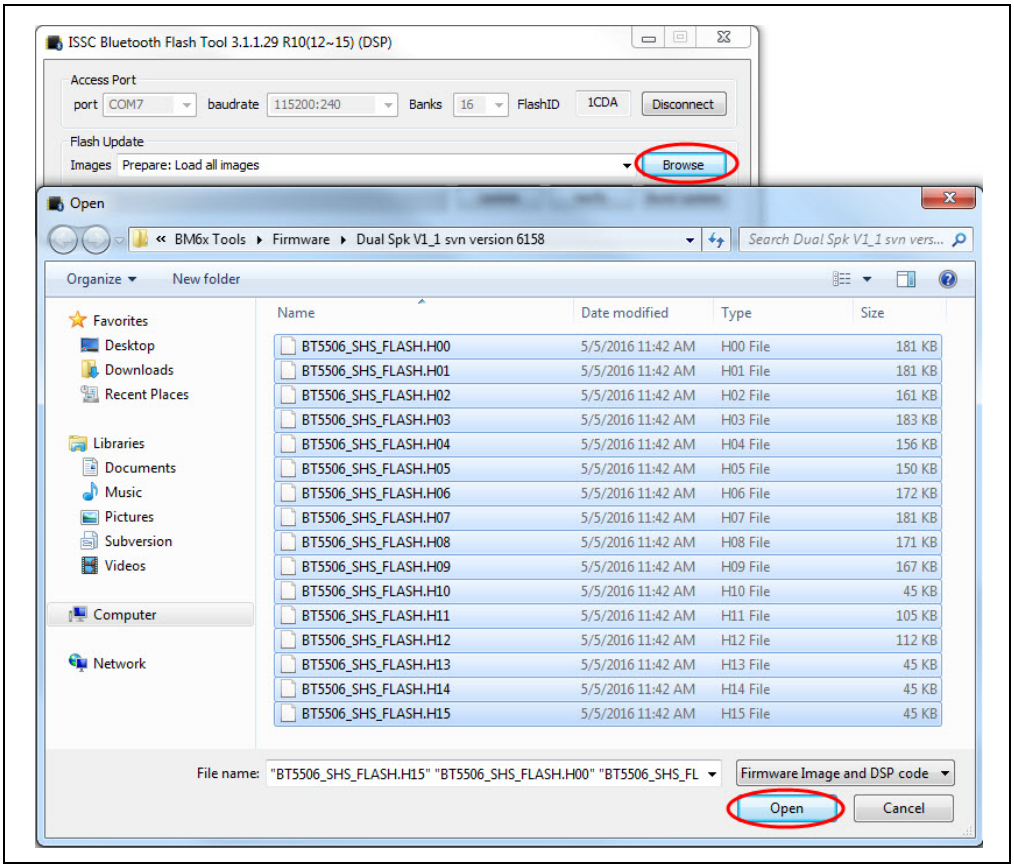
3. Open the `isbtflash.exe` firmware update tool on a host PC. Specify the **COM Port** and then click **Connect**, as illustrated in Figure 3-38.

FIGURE 3-38: ISBTFLASH TOOL



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

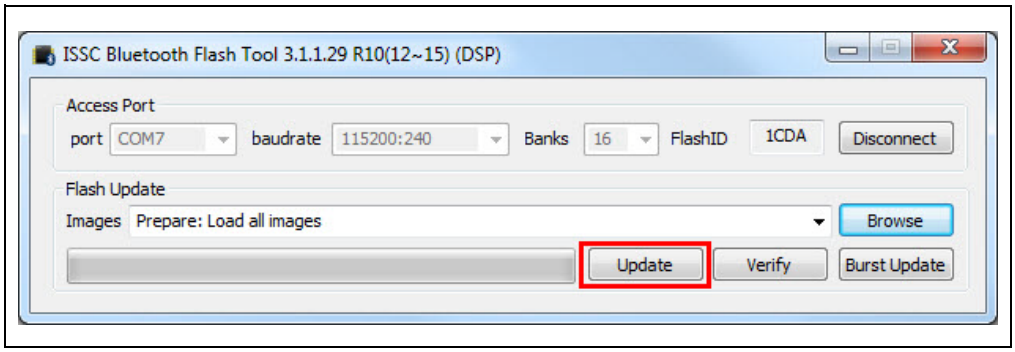
FIGURE 3-39: LOADING FLASH CODE FILES



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**.

FIGURE 3-40: UPDATING FLASH CODE



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.

3.7 UPDATING MCU PARAMETERS

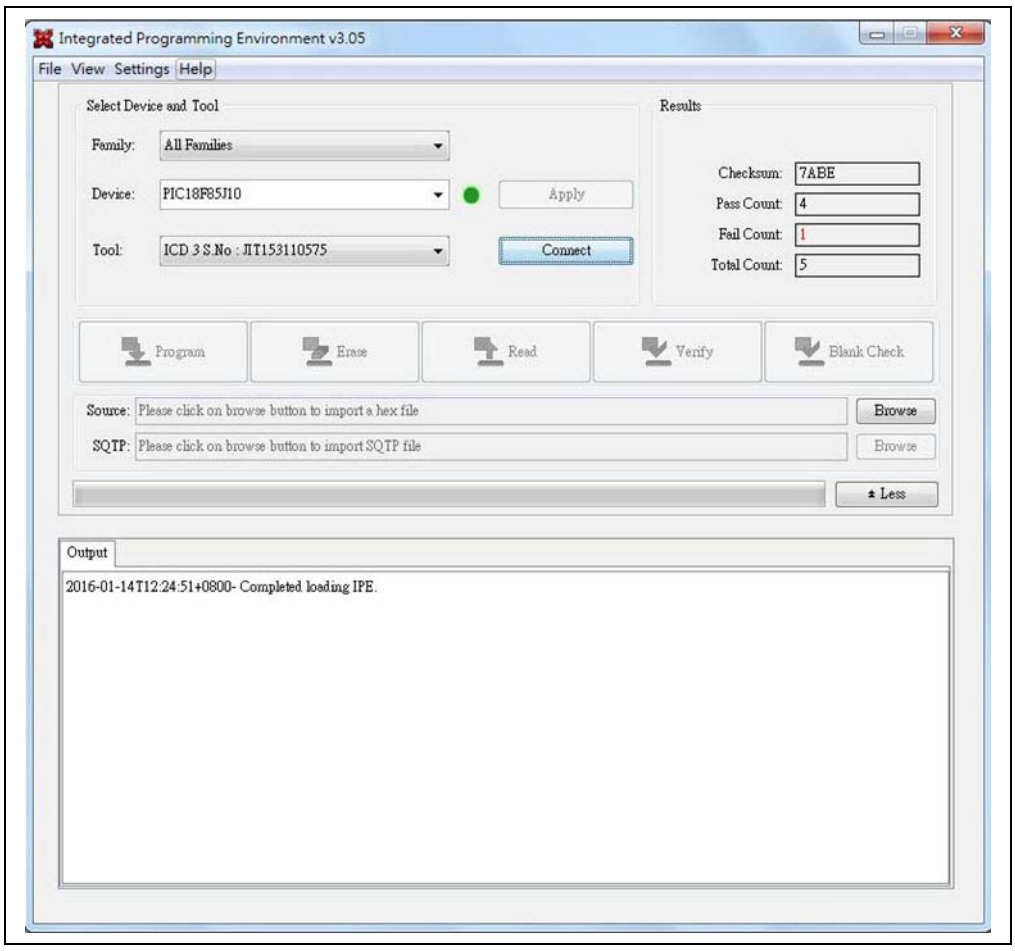
The on-board MCU is pre-programmed for dual-mode, and the MCU parameters needs to be changed for other applications.To update the MCU parameters, perform these actions:

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.

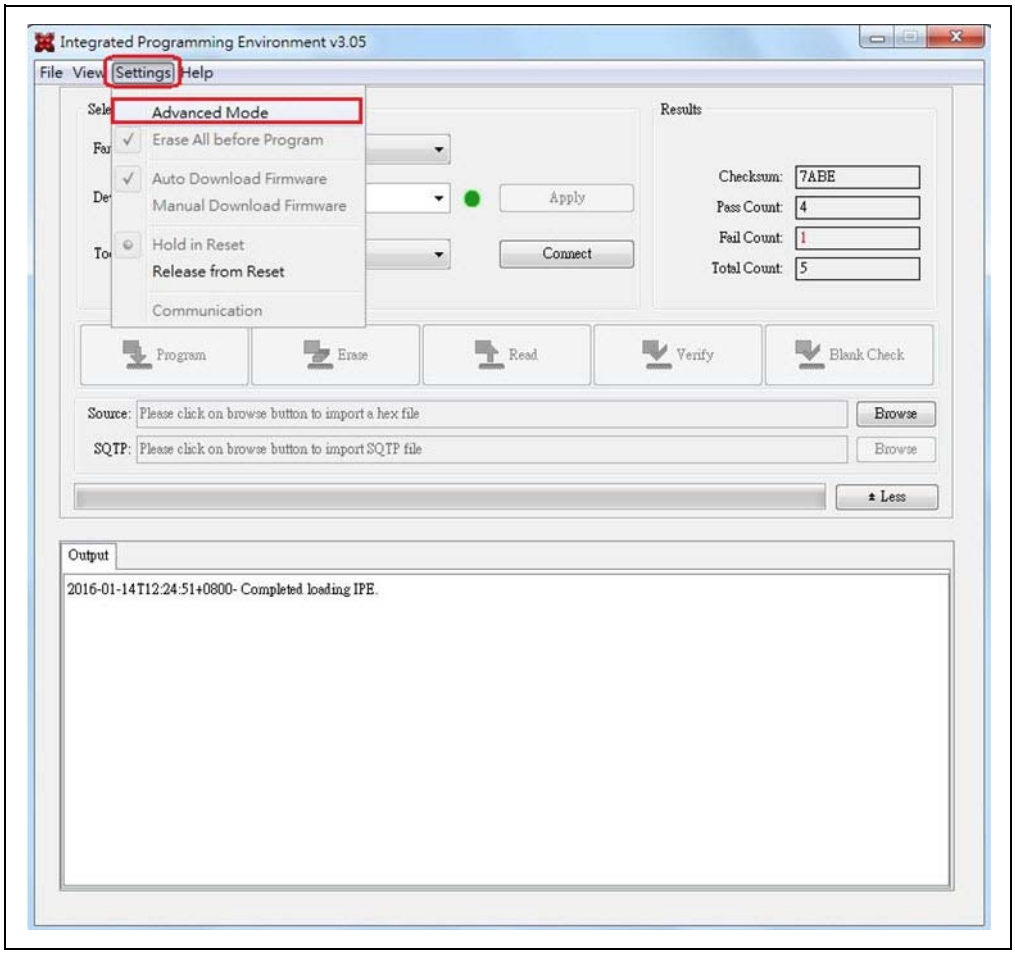
3. Ensure that a jumper on JP33 is connected. Open the MPLAB X IDE tool and a window displays, see Figure 3-41.

FIGURE 3-41: MPLAB® X IDE TOOL



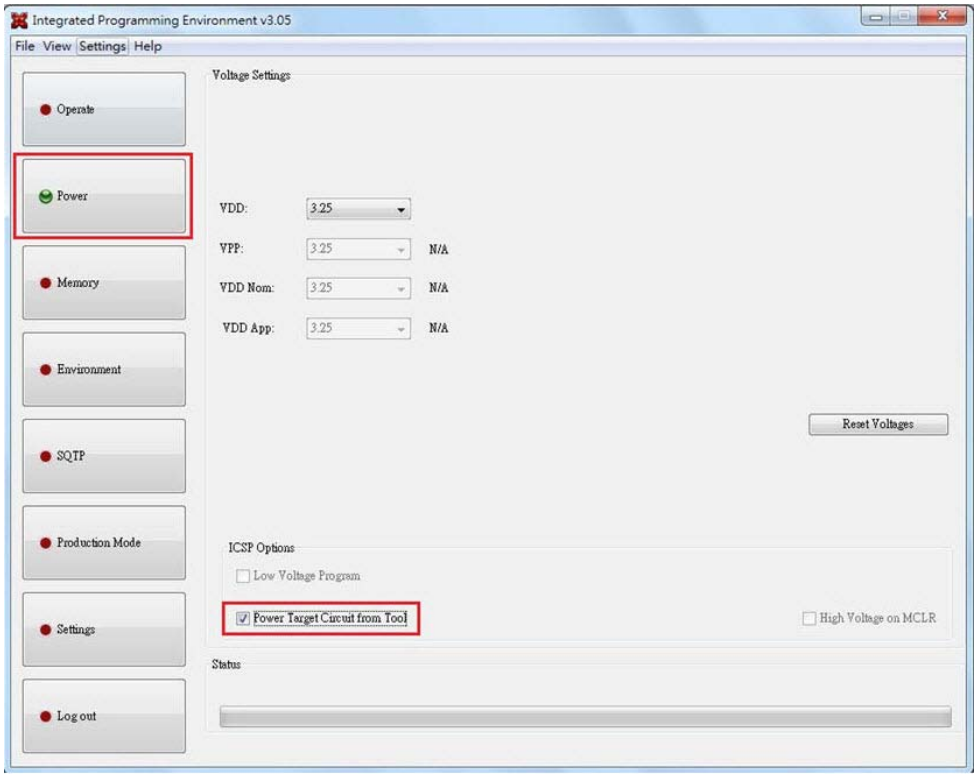
4. From Settings, select “Advanced Mode”, see Figure 3-42.

FIGURE 3-42: ADVANCED MODE SETTINGS



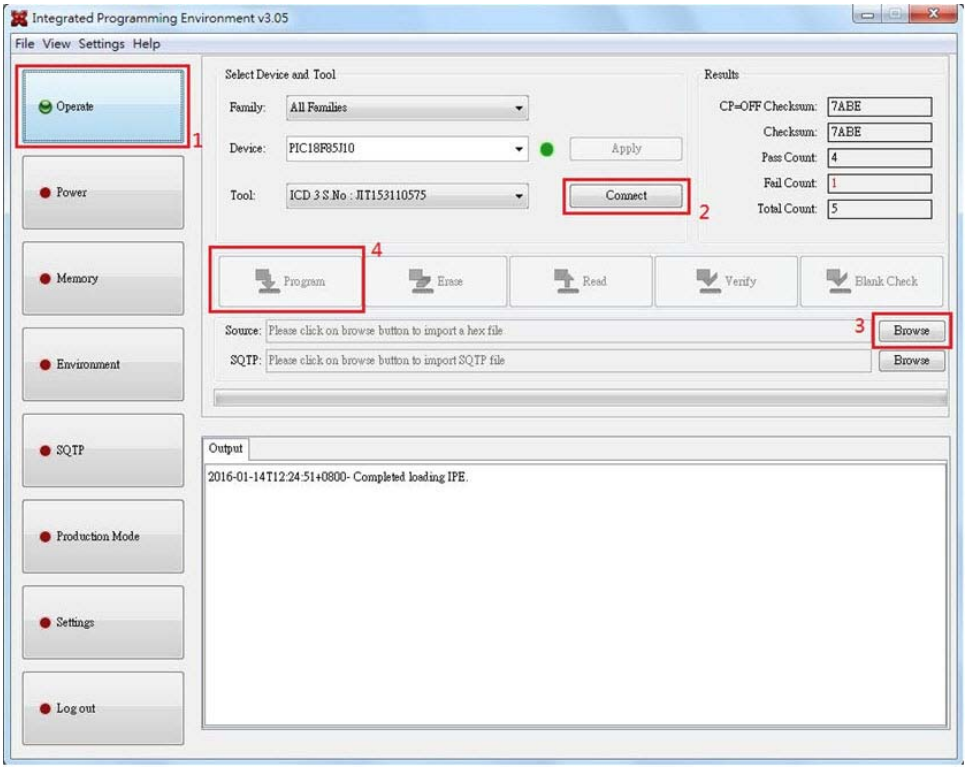
5. The MPLAB X IDE tool displays a window with various options (tabs) to configure the parameters. Click **Power** tab, and then enable **Power Target Current from Tool**, as illustrated in Figure 3-43.

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.

FIGURE 3-44: DEVICE AND TOOL SETTING

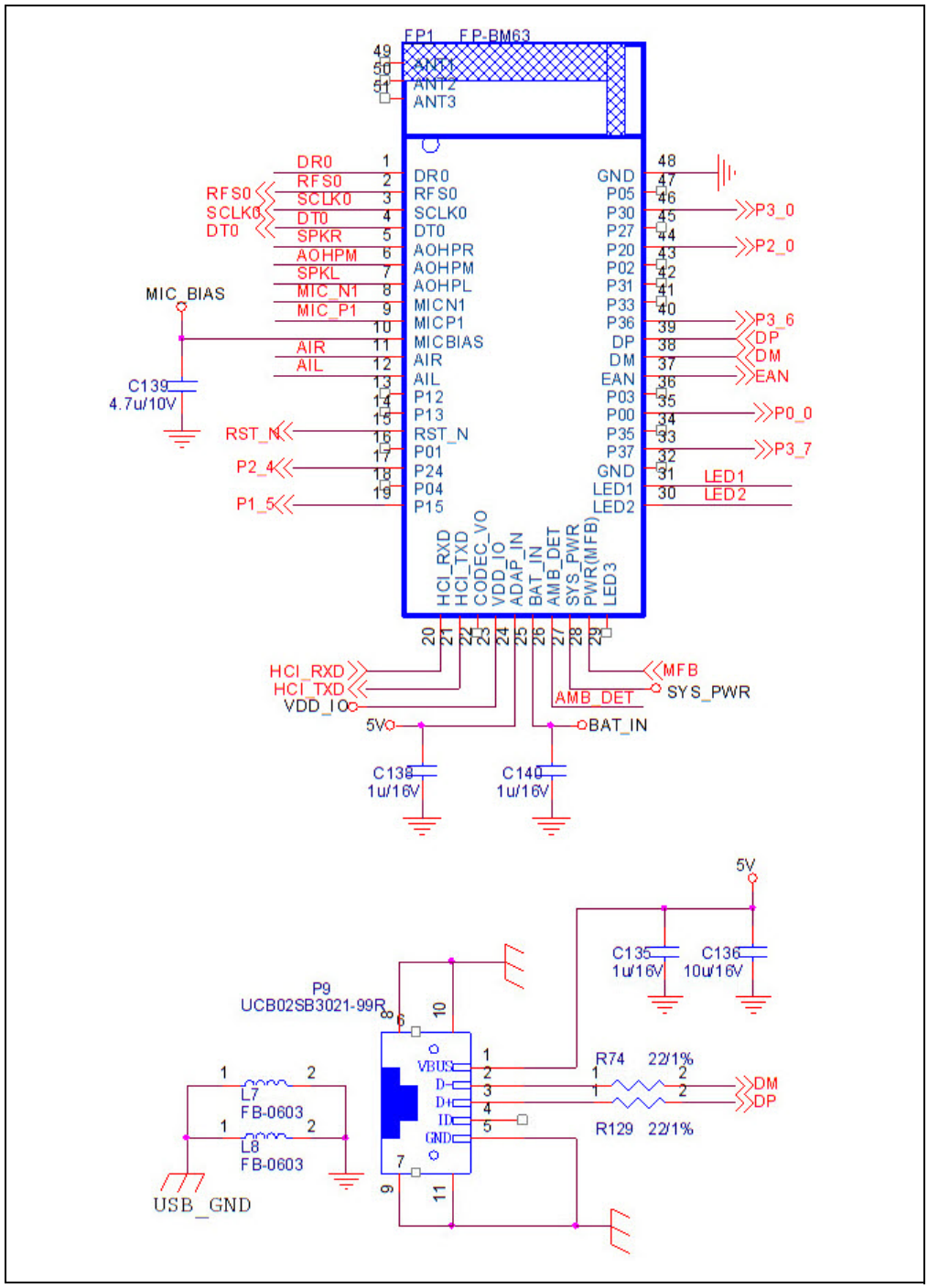


NOTES:

Appendix A. Schematics

A.1 REFERENCE SCHEMATICS

FIGURE A-1: BM63 EVB SCHEMATICS



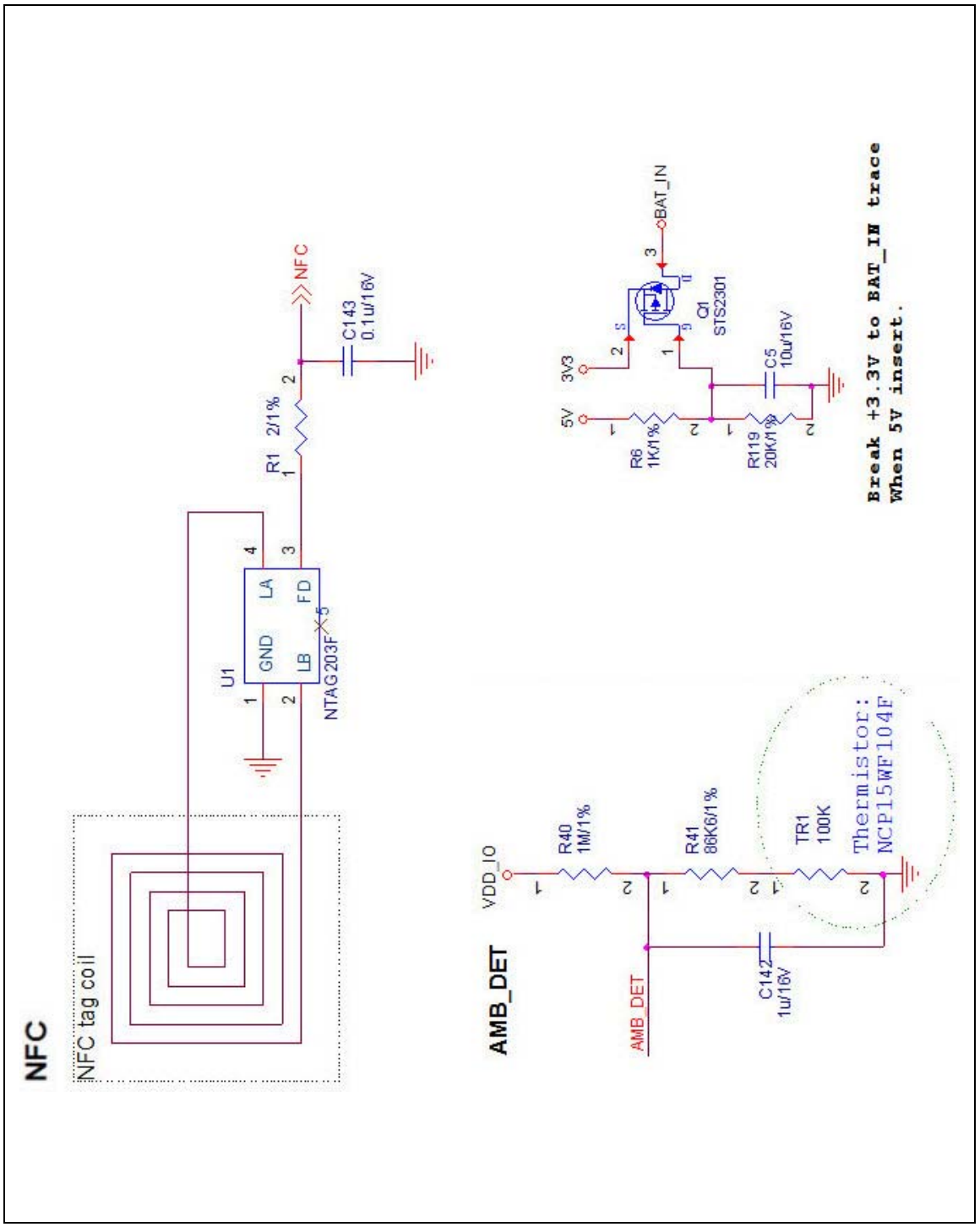


FIGURE A-2: NFC

FIGURE A-3: STATUS LEDS

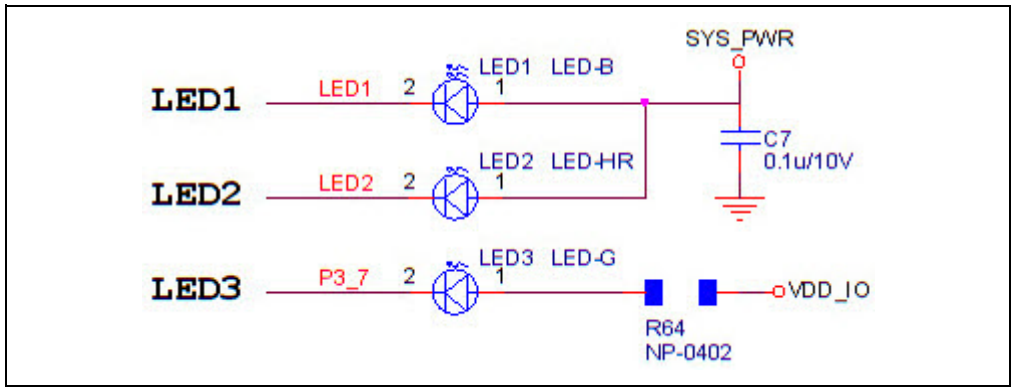


FIGURE A-4: RESET BUTTON

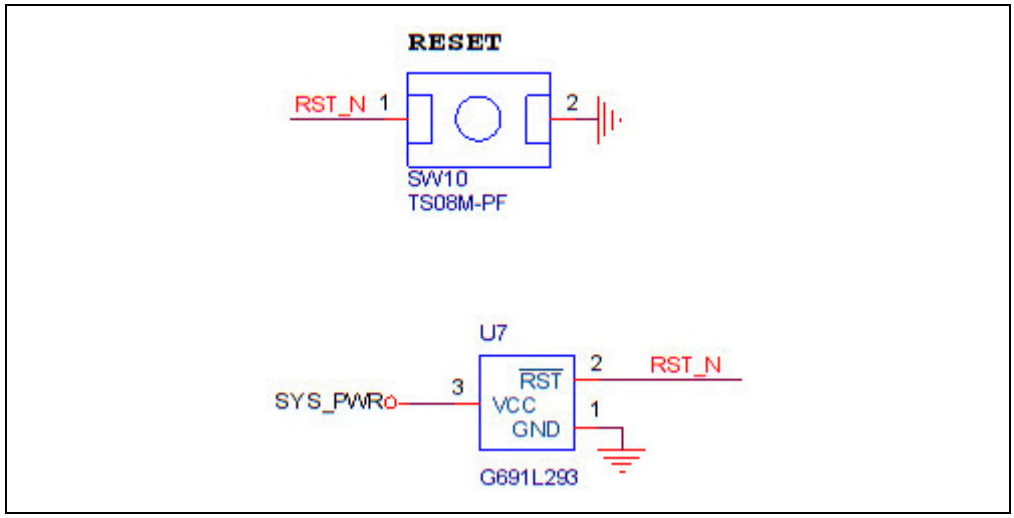


FIGURE A-5: EXTERNAL CONNECTOR J6

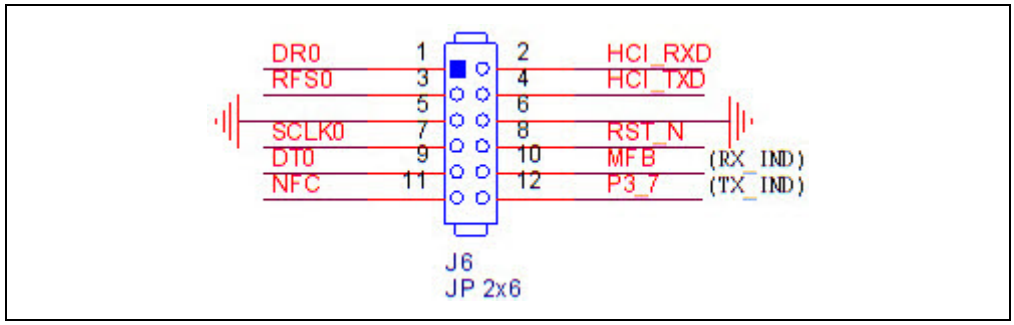


FIGURE A-6: LINE INPUT

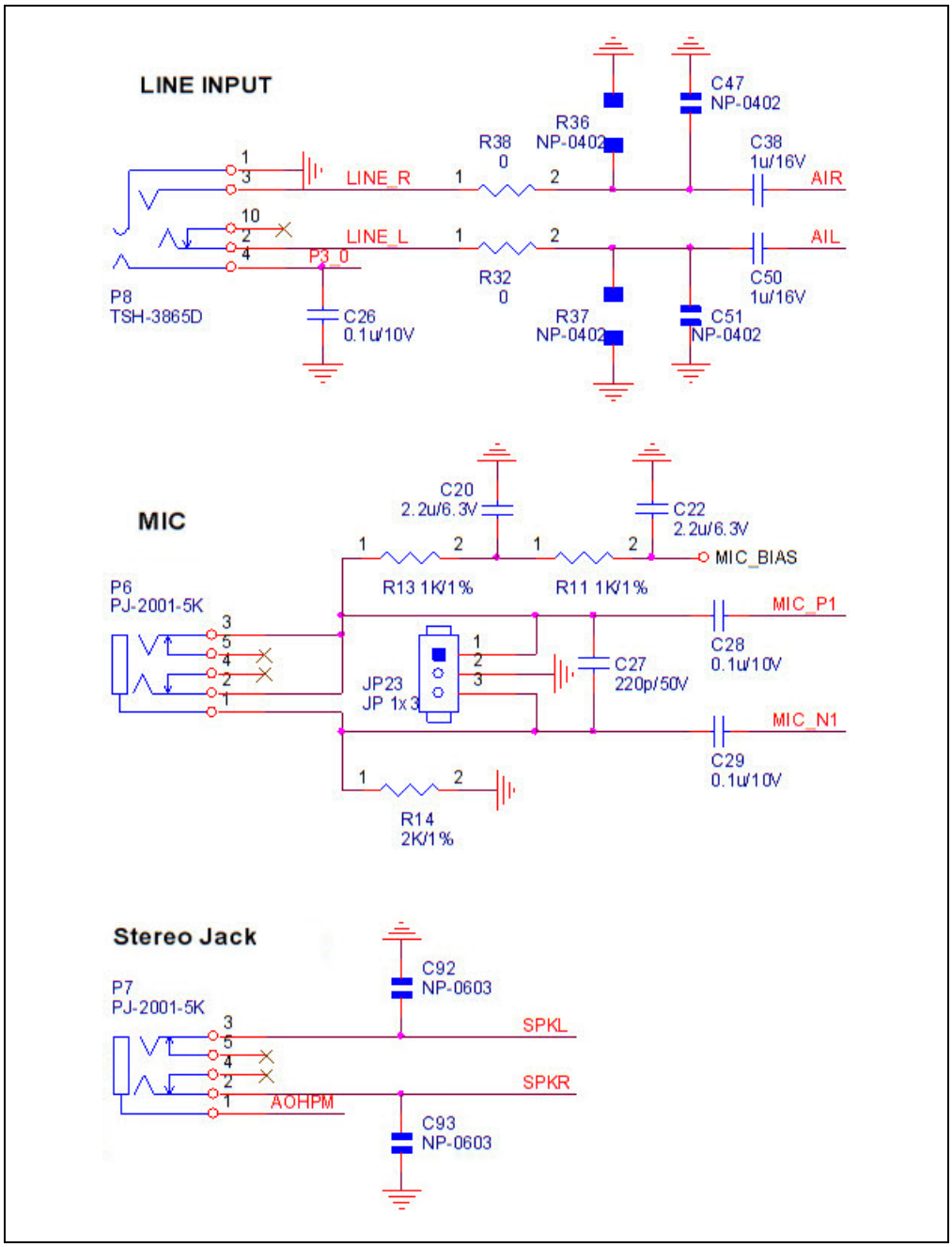


FIGURE A-7: HCI INTERFACE

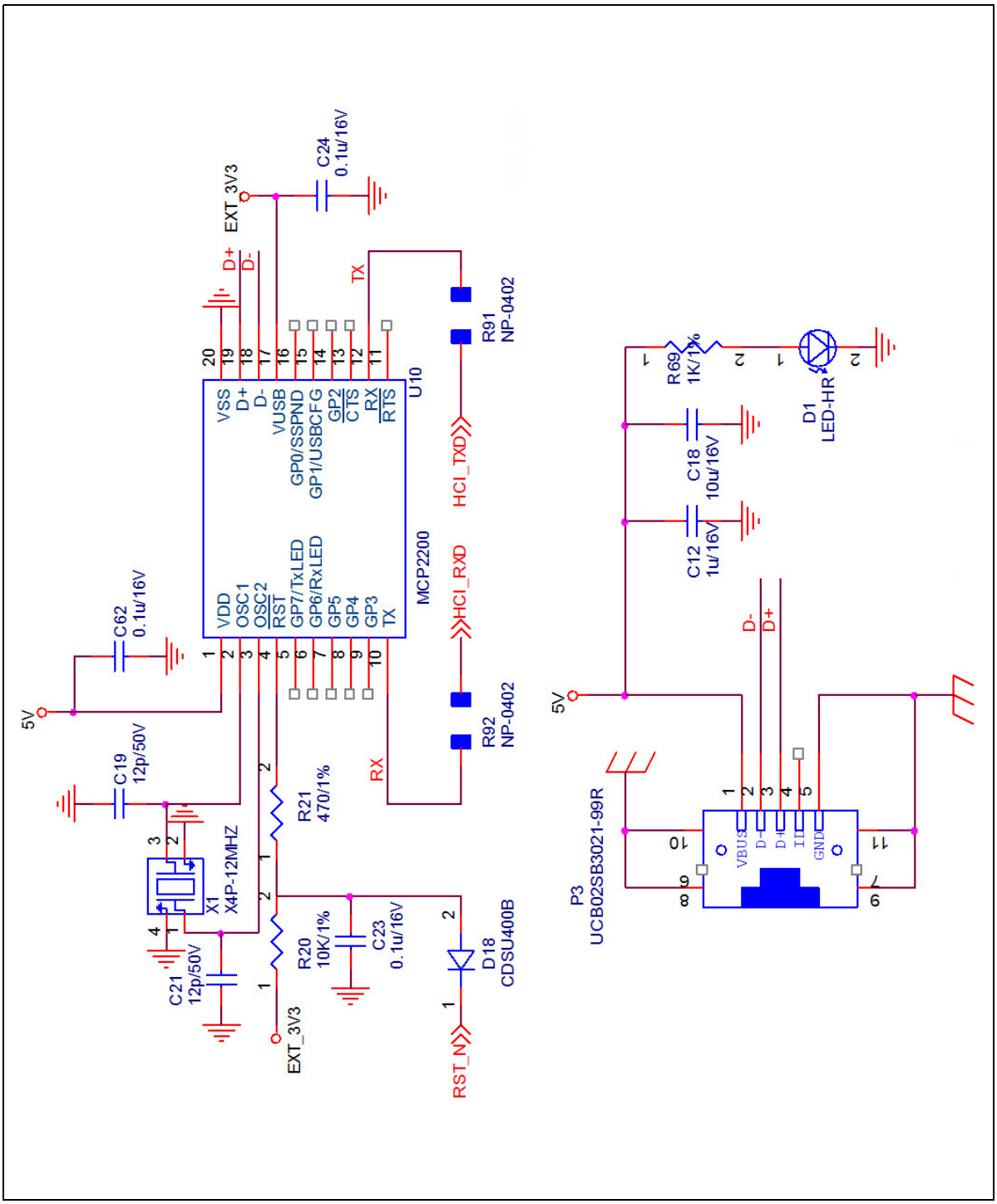


FIGURE A-8: UART INTERFACE

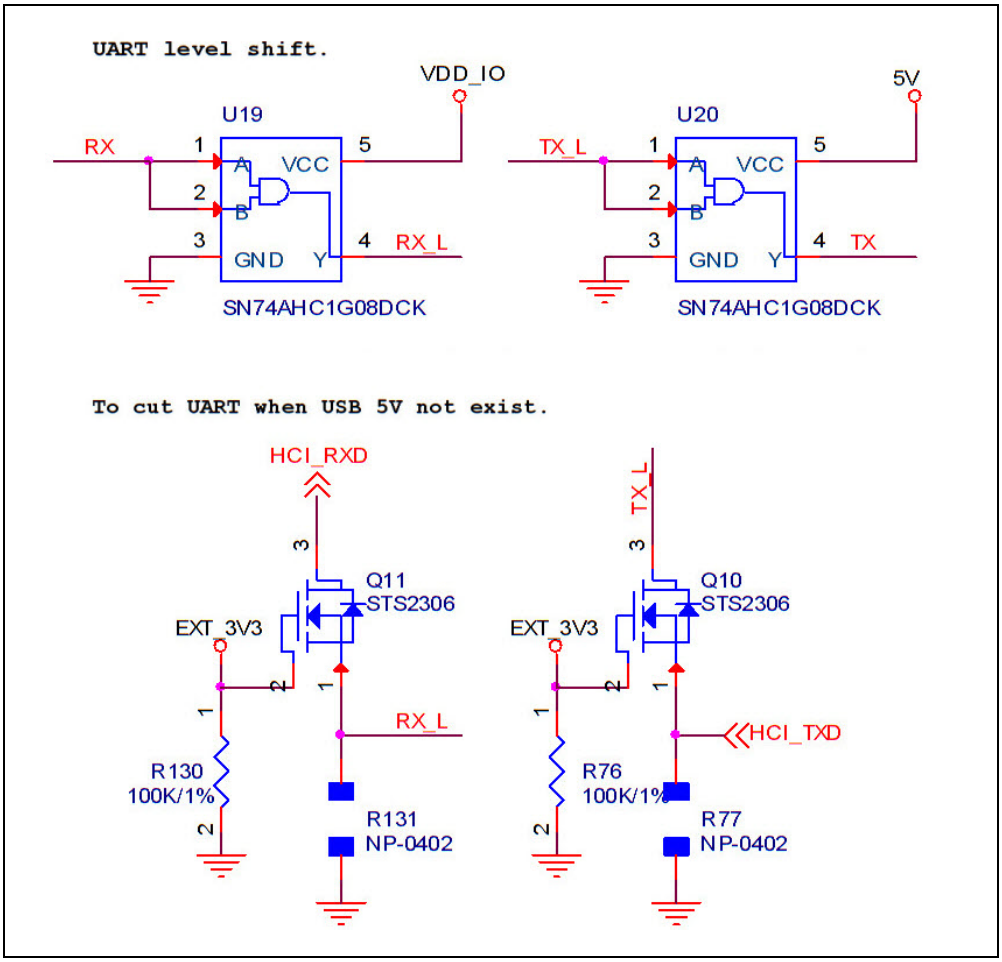
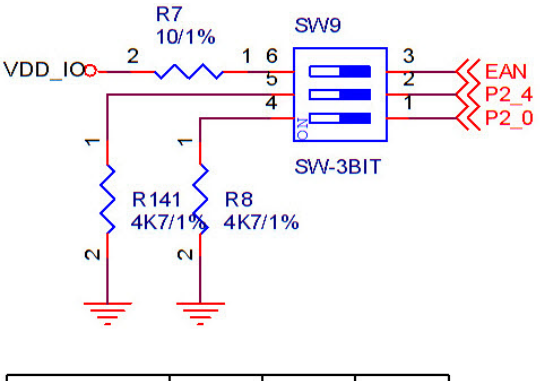
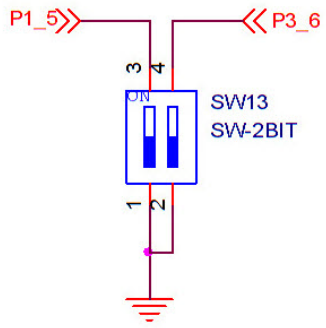


FIGURE A-9: SWITCH SW9 AND SW13 DETAILS





	EAN	P2_4	P2_0
ROM APP	ON	OFF	OFF
ROM TEST	ON	OFF	ON
Flash APP	OFF	OFF	OFF
Flash TEST	OFF	OFF	ON
LOAD CODE	OFF	OFF	ON

	P1_5	P3_6
Single	OFF	OFF
Double	ON	ON
L	OFF	ON
R	ON	OFF

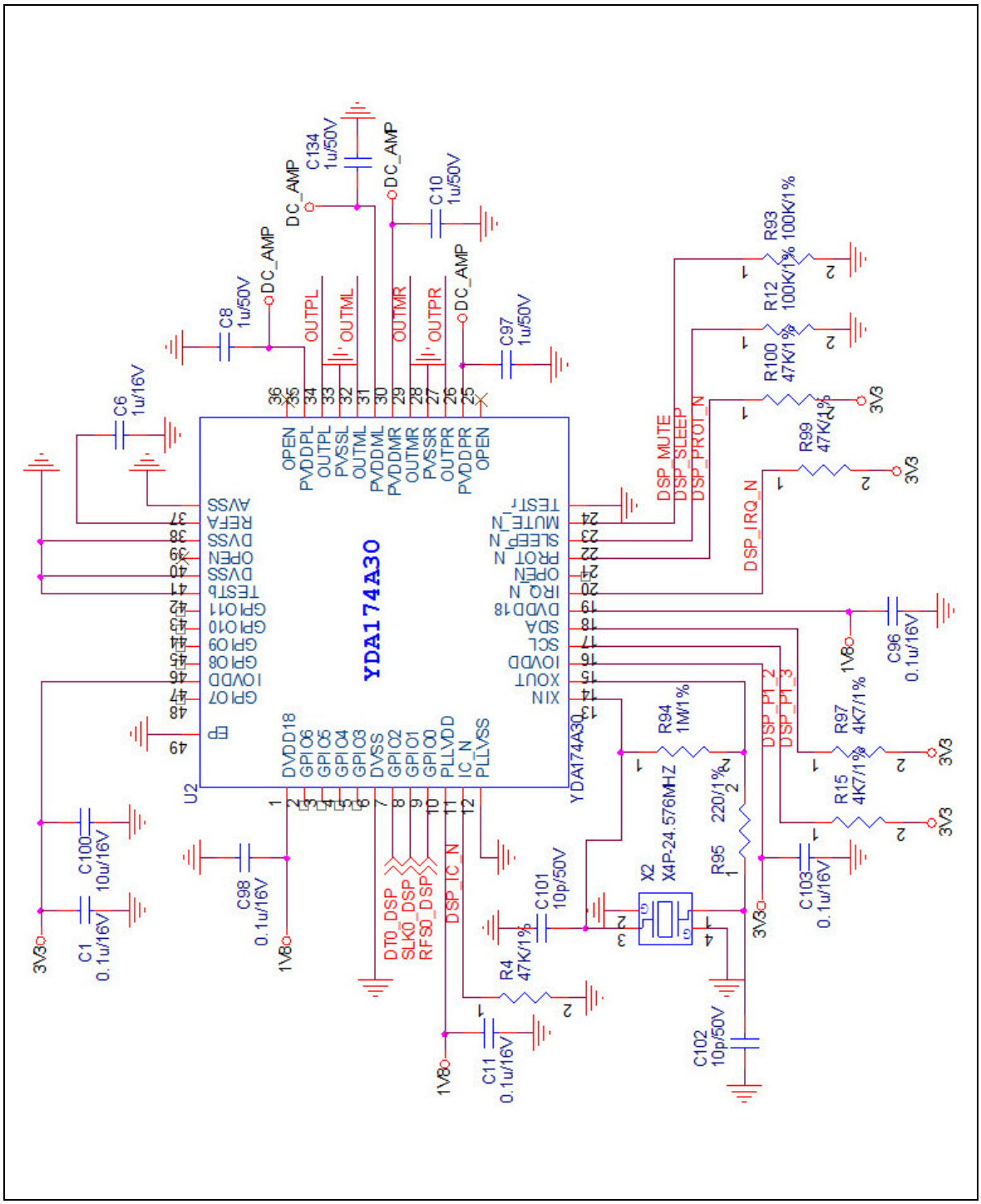


FIGURE A-10: DSP SCHEMATICS

FIGURE A-11: DSP/MCU INTERFACE

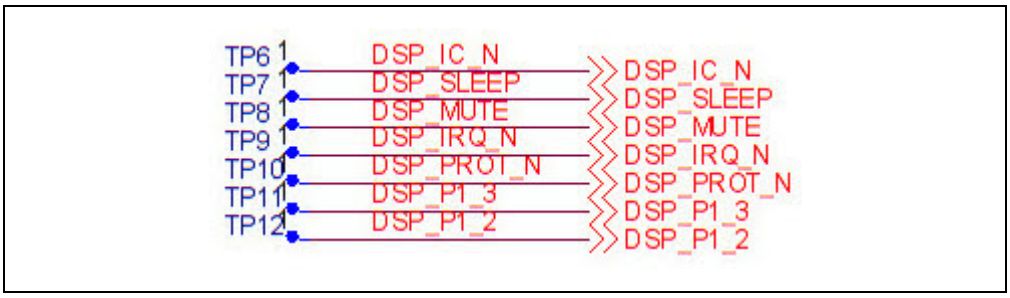


FIGURE A-12: POWER SUPPLY

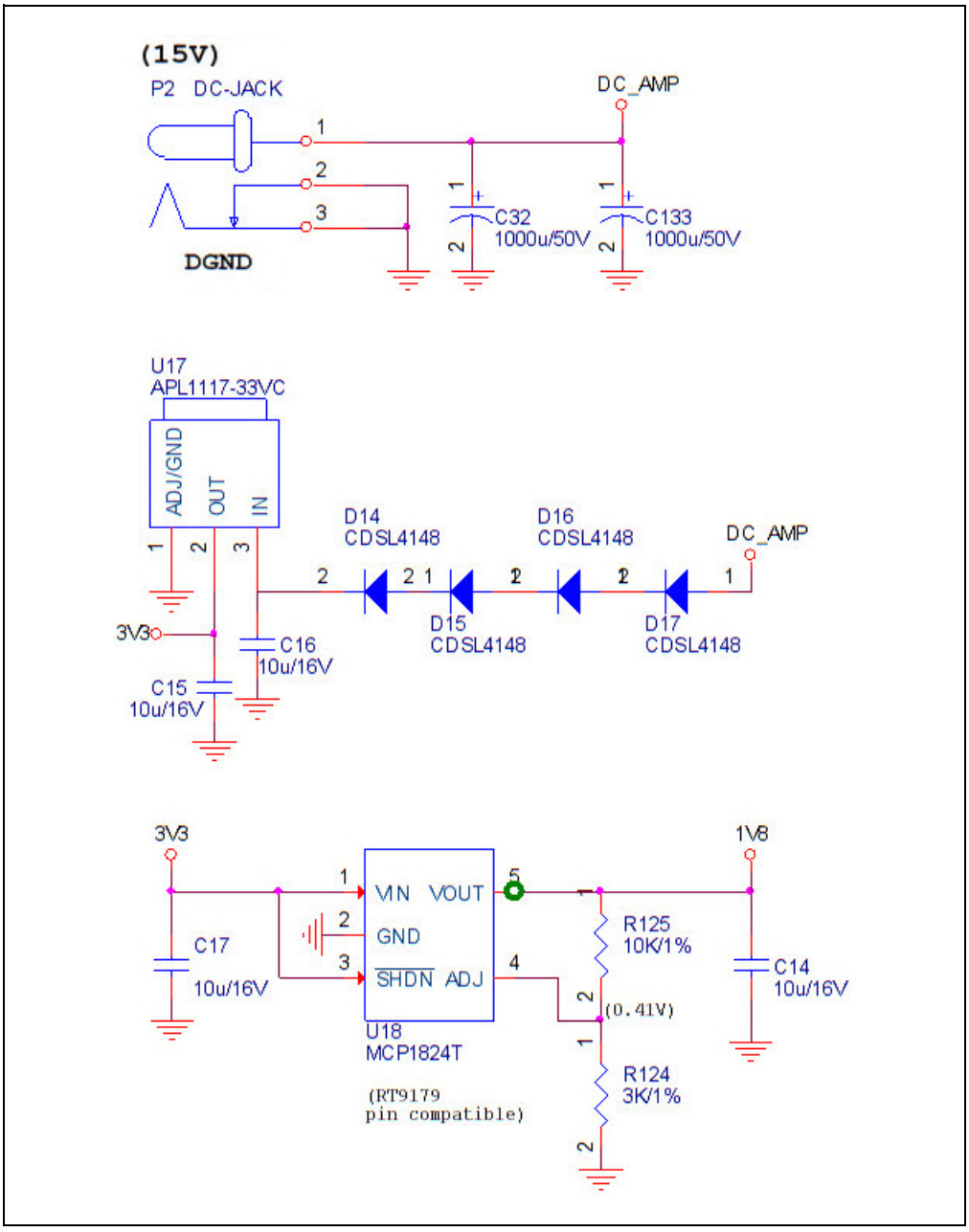
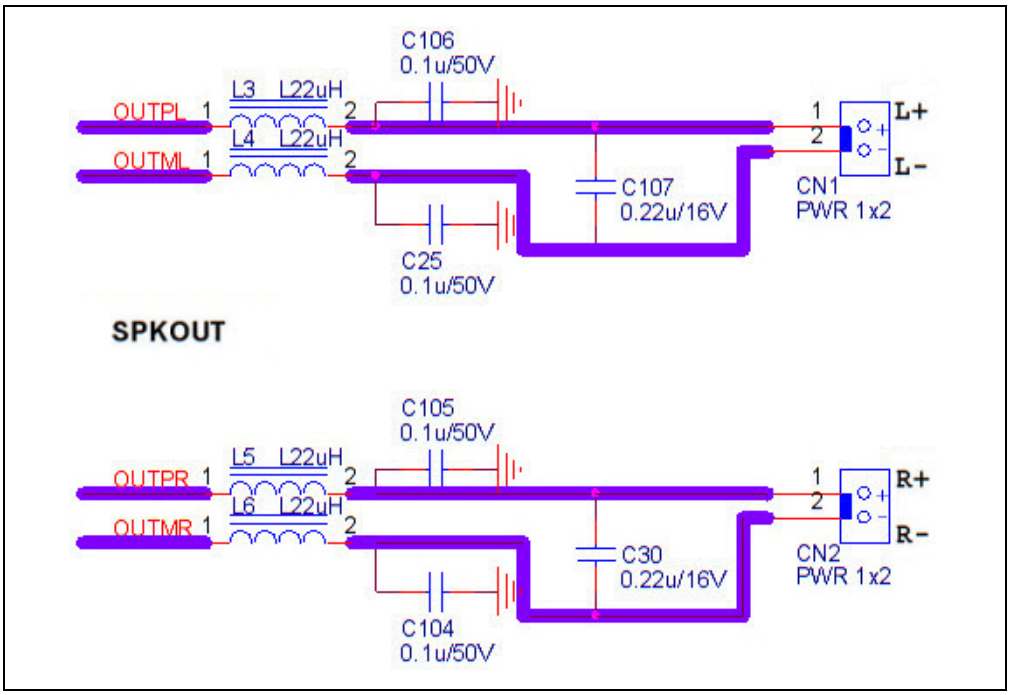


FIGURE A-13: SPEAKER OUTPUT



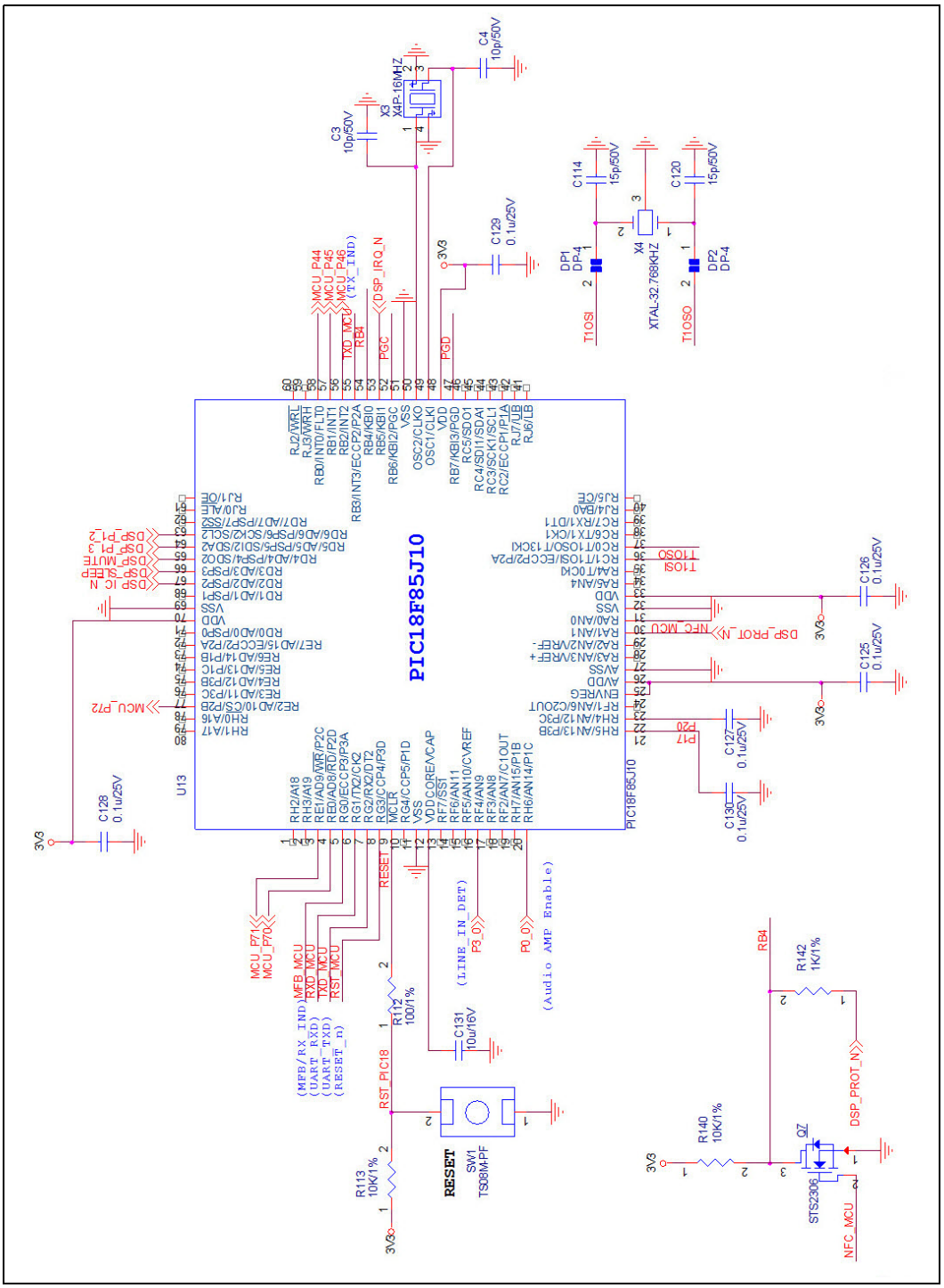


FIGURE A-14: MCU PIC18

FIGURE A-15: SWITCH SW46 AND SW47 DETAILS

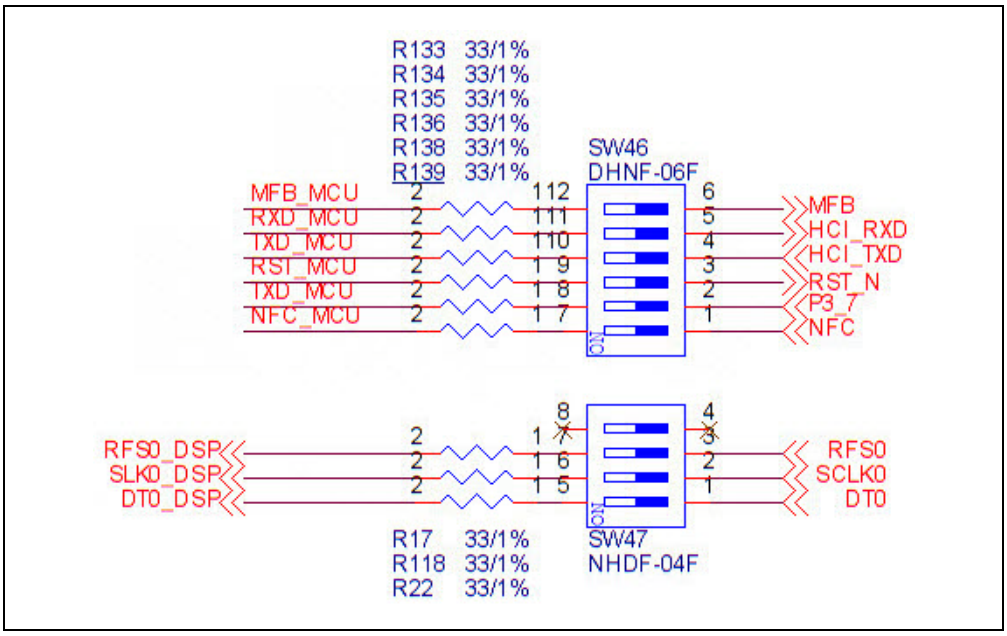


FIGURE A-16: ICSP

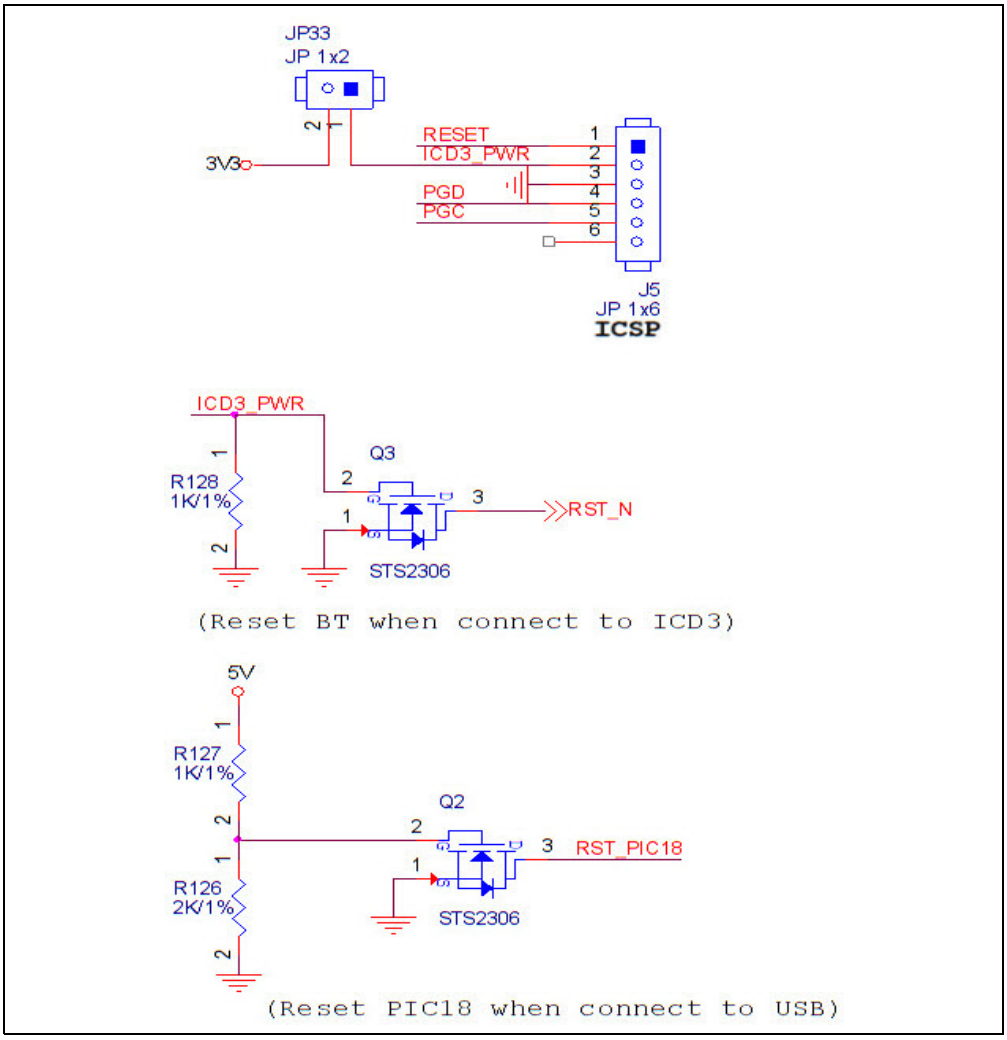
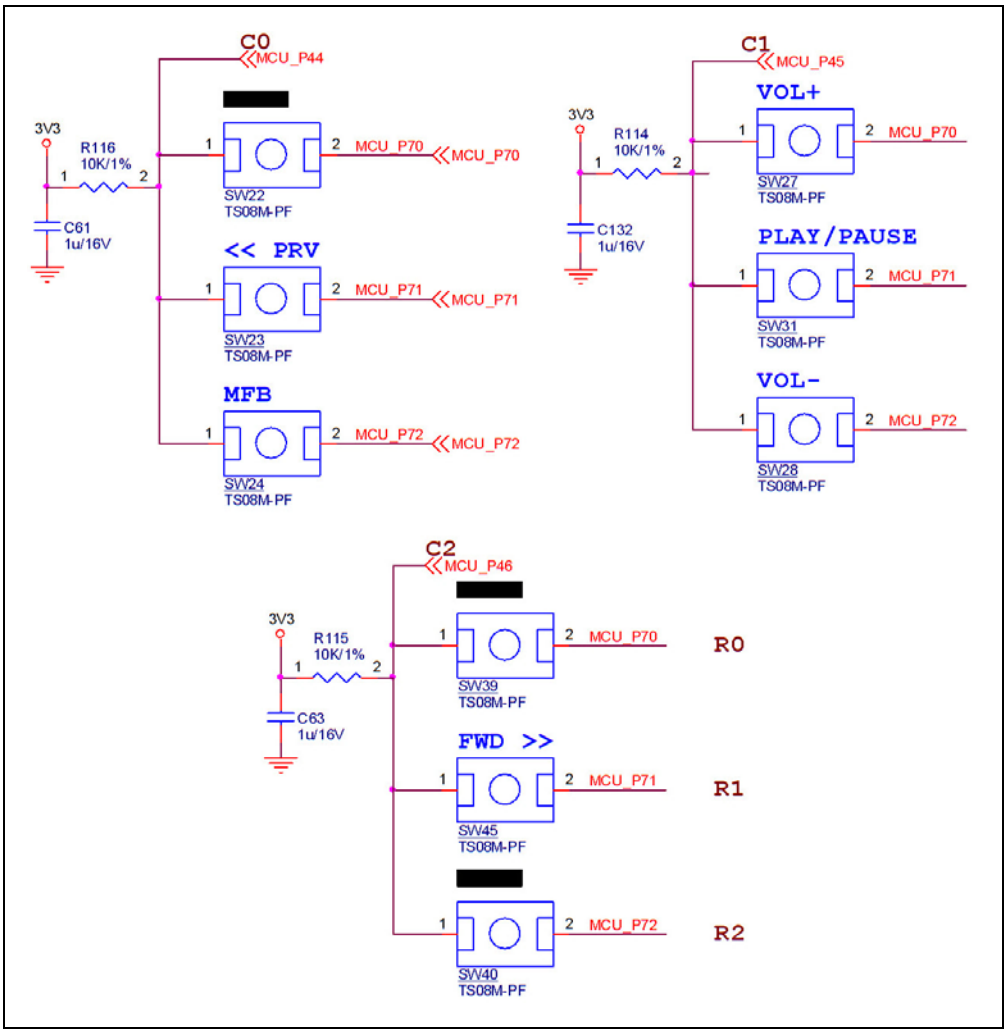


FIGURE A-17: MCU BUTTON



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