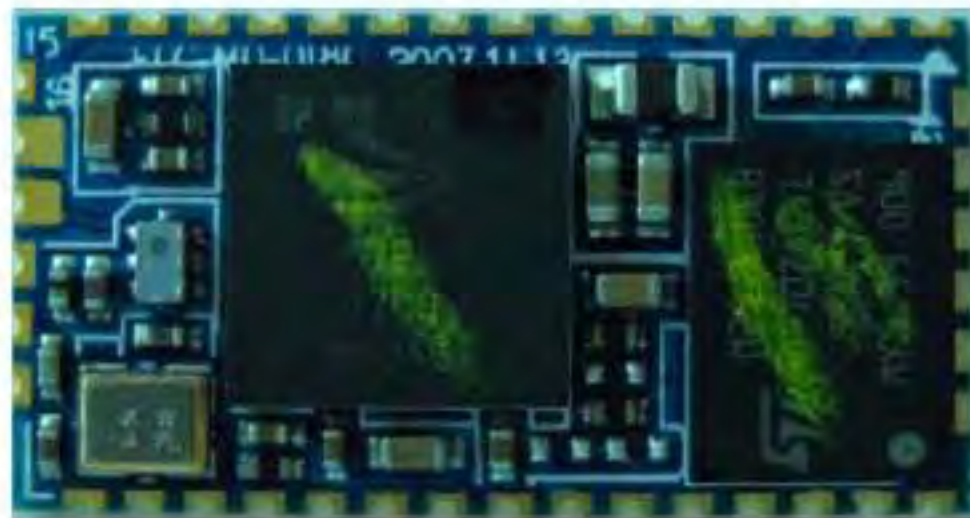


BTMDC751 Series

BTMDC751
BTMDC8751

User Manual



Product Name:	Bluetooth modules
Module Name:	BTMDC751 BTMDC8751
Version:	1.0
Release Date:	September 19, 2010

Copyright 2009 by Flaircomm Technologies Inc., All Right Reserved

Without written permission from Flaircomm Technologies Inc., reproduction, transfer, distribution or storage of part or all of the contents in this document in any form is prohibited

Address: No.5 Bibo Road, Keyuan Building, 4F, Zhangjiang Hi-Tech Park, Shanghai 201203, P.R.China
Telephone: 86-21-51088733 Fax: 86-21-50276103
www.flaircomm.com

Compliance Information

FCC Compliance Statement:

This device complies with Part 15 of the FCC Rules . Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation. This device must accept any interference received, including interference that may cause undesired operation. Product that is a radio transmitter is labeled with FCC ID.

FCC Caution:

(1) Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

(2) Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

(3) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

(4) Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

(5) Outdoor Operations in the 5.15~5.25GHz band is prohibited.

NOTE:

(1) This device is approved for OEM installation with specified antennas as listed in this Manual. It is the responsibility of the Installer to comply with the separation distance for satisfying RF exposure compliance.

(2) This device only could work when being installed into "client devices" which could not transmit automatically, such as Notebook P.C. , with the software driver limit.

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

CONTENTS

1. INTRODUCTION	5
1.1 BLOCK DIAGRAM OF THE FLC-BTMDC751 MODULE.....	5
1.2 IMPLEMENTATION OF THE FLC-BTMDC751 IN CAR ELECTRONICS SYSTEMS.....	6
1.2.1 Scheme 1: FLC-BTMDC751 Module is Mounted on the Mainboard	6
1.2.2 Scheme 2: FLC-BTMDC751 Module is Mounted on the Front Panel	7
1.3 FEATURES	7
2. GENERAL SPECIFICATION.....	9
3. PIN DEFINITION.....	11
3.1 PIN CONFIGURATION AND PACKAGE DIMENSIONS	11
3.2 PIN DEFINITION	11
3.3 ELECTRICAL CHARACTERISTICS	13
4. FLC-BTMDC751 INTERFACES	15
4.1 POWER SUPPLY AND RESET.....	15
4.2 RF	15
4.3 AUDIO	16
4.4 UART INTERFACE.....	17
4.5 GENERAL PURPOSE DIGITAL IO	17
4.5.1 Button Interface	17
4.5.2 Control Interface for Audio Signals.....	17
4.5.3 LED Interface	17
4.6 GENERAL PURPOSE ANALOGUE IO	18
4.7 ISP INTERFACES.....	18
5. RECOMMENDED PCB MOUNTING PATTERN	19
6. APPLICATION SCHEMATIC.....	20

TABLE OF FIGURES

Figure 1 FLC-BTMDC751 Bluetooth Solution for Car Electronics Systems (The FLC-BTMDC751 module is marked with grey in the diagram)	6
Figure 2 FLC-BTMDC751 on the System Mainboard	7
Figure 3 FLC-BTMDC751 on the Font Panel	7
Figure 4 FLC-BTMDC751 pin definition	11
Figure 5 Design of Power Supply and Reset	15
Figure 6 Scheme 1: Design of RF when mounting FLC-BTMDC751 on Mainboard	15
Figure 7 Scheme 2: Design of RF when mounting FLC-BTMDC751- on Front Panel	16
Figure 8 Scheme 1: Design of Audio Interfaces	16
Figure 9 Design of UART	17
Figure 10 Design of General Purpose Digital IO	17
Figure 11 Design of ISP Interface	18
Figure 12 Recommended PCB Mounting Pattern	19
Figure 13 FLC-BTMDC751 Application Schematics	20

TABLE OF TABLES

Table 1 Ordering Information	5
Table 2: General Specification	9
Table 3: Pin Definition of FLC-BTMDC751	11
Table 4: Absolute Maximum Rating	13
Table 5: Recommended Operating Conditions	13
Table 6: Audio Output Terminal Characteristics	13

1. Introduction

FLC-BTMDC751 is a fully integrated Bluetooth module. It is one of the BlueTone™ series products developed by Flaircomm. FLC-BTMDC751 is based on CSR's Bluecore5-Multimedia External with specific interface design to meet automobile industrial and mobile accessory customers' needs. It complies with Bluetooth BQB certification.

FLC-BTMDC751 complies with Bluetooth specification version 2.0. It integrates RF, Baseband controller, etc., a completed Bluetooth subsystem, in an ultra small package. FLC- BTMDC751 supports HS/HF, A2DP, AVRCP and SPP profiles. It provides a UART interface, several user programmable I/Os, stereo speaker outputs, microphone inputs and a USB port.

FLC-BTMDC751 can be controller by UART port or/and several digital input ports. Please refer to FLC-BTMD751 software user guide for the interfacing protocol.

Table 1 Ordering Information

Part Name	Digital IO	Analogue IO	PCM	RF Connector	Supply Voltage	Package
FLC-BTMDC751	14	2	No	No	3.3	Refer to 3.1

1.1 Block Diagram of the FLC-BTMDC751 Module

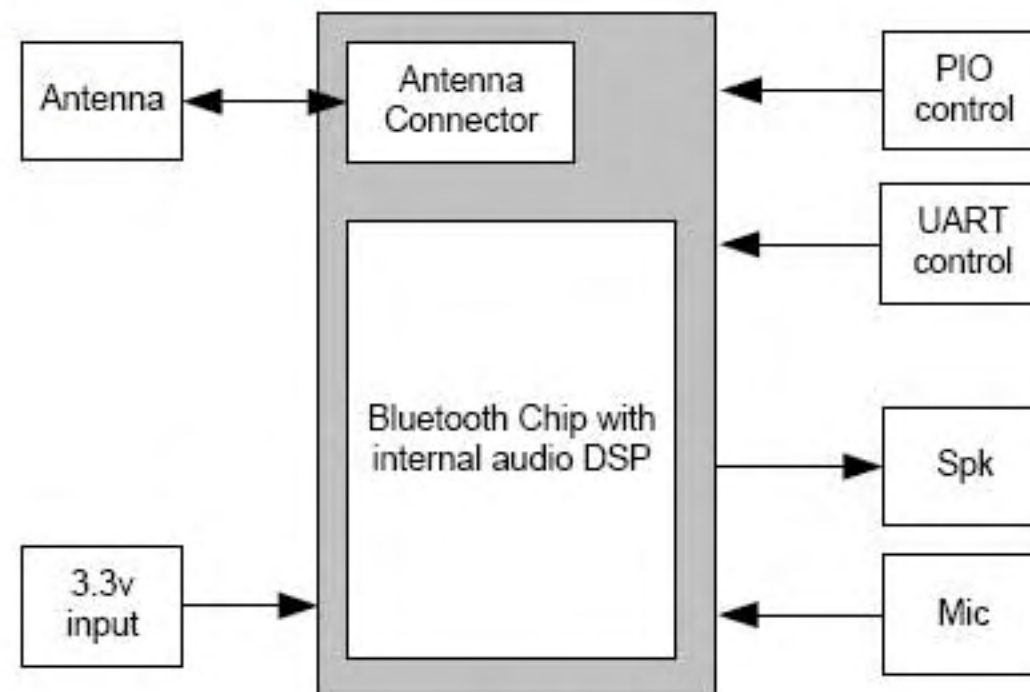


Figure 1 FLC-BTMDC751 Bluetooth Solution for Car Electronics Systems (The FLC-BTMDC751 module is marked with grey in the diagram)

1.2 Implementation of the FLC-BTMDC751 in Car Electronics Systems

1.2.1 Scheme 1: FLC-BTMDC751 Module is Mounted on the Mainboard

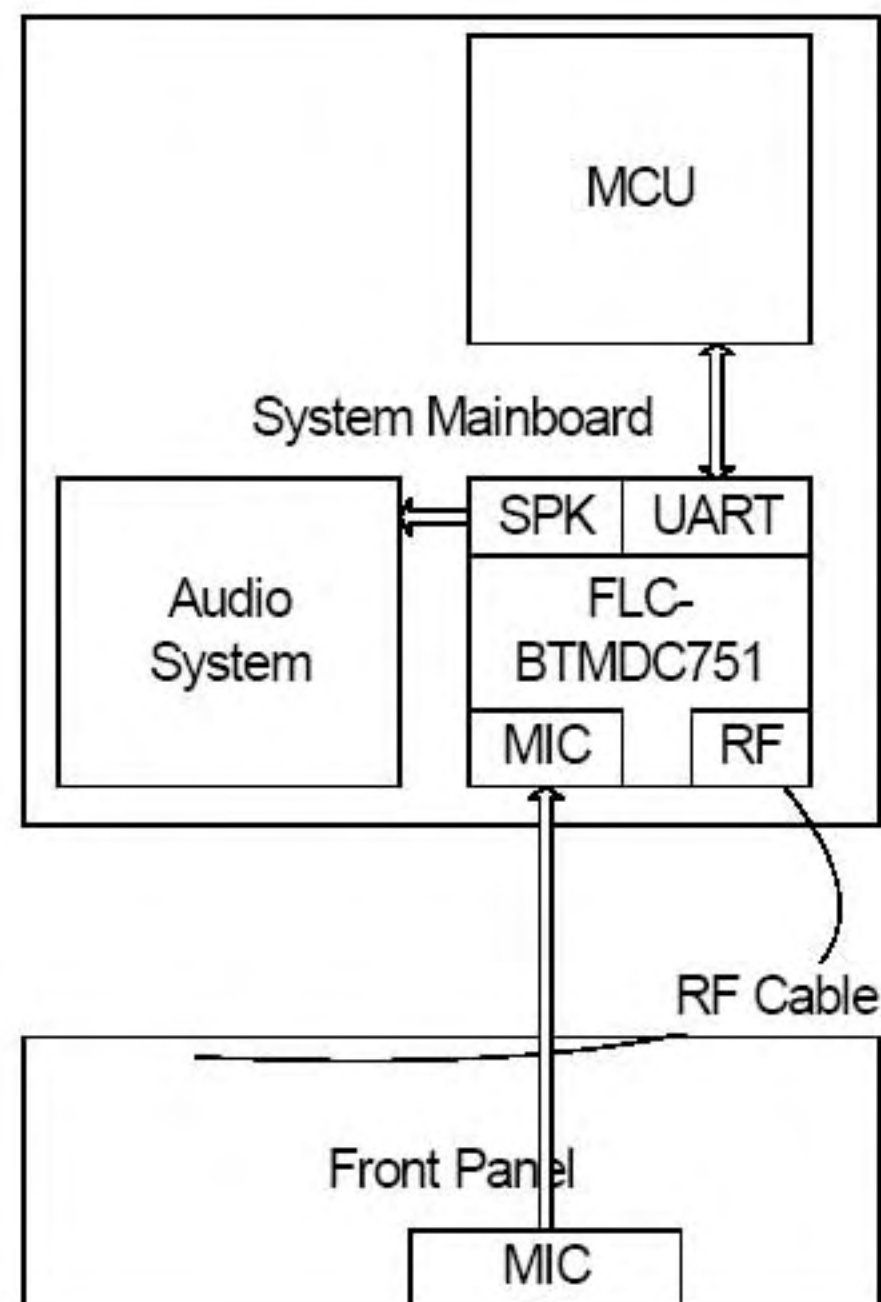


Figure 2 FLC-BTMDC751 on the System Mainboard

1.2.2 Scheme 2: FLC-BTMDC751 Module is Mounted on the Front Panel

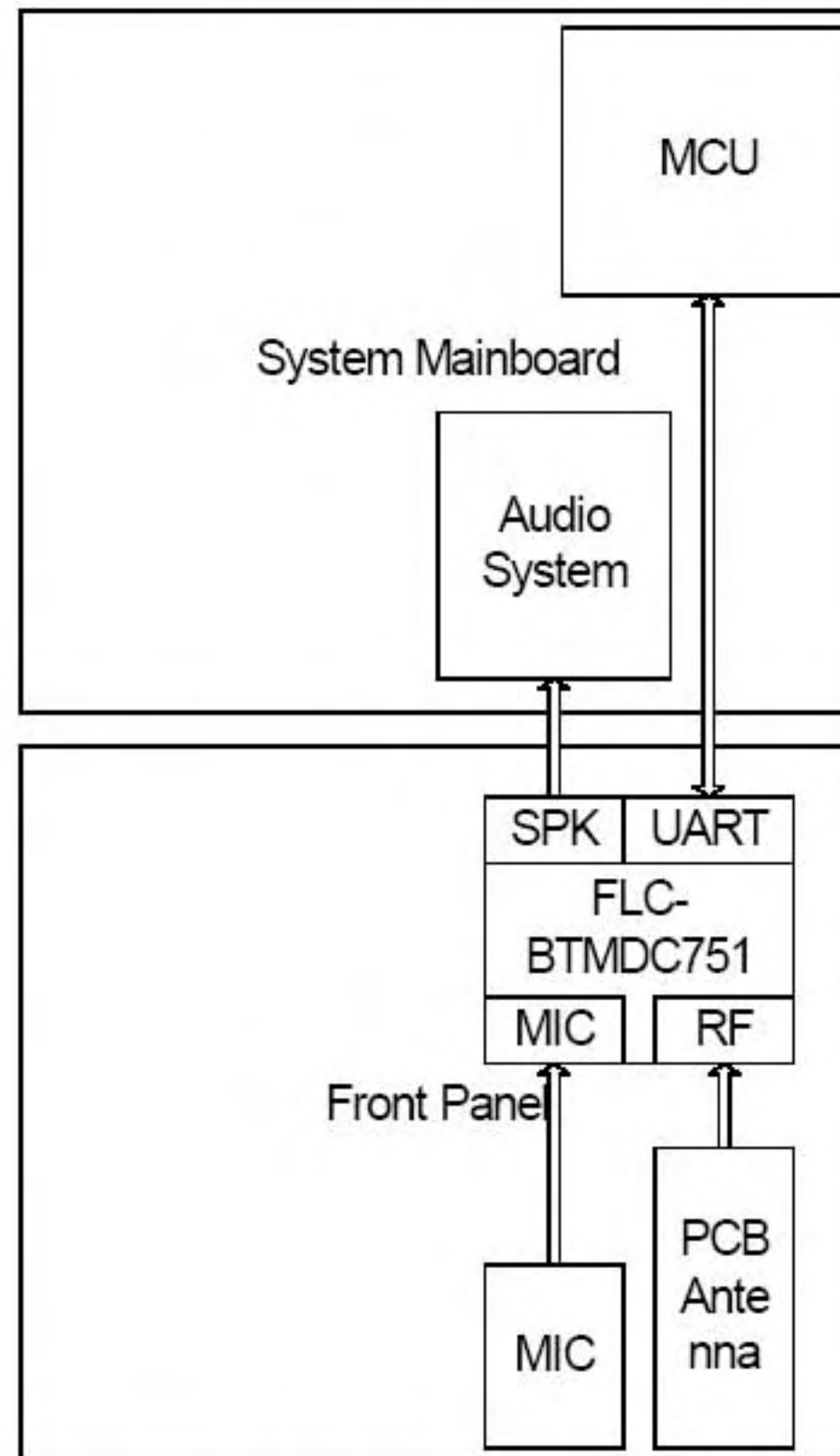


Figure 3 FLC-BTMDC751 on the Font Panel

1.3 Features

- Bluetooth V2.1
- A2DP, AVRCP, HS/HF and SPP Profiles
- Make and Receive Call
- Accept/Reject/End Calls

- Call Waiting
- Conference Call
- Last Number Redial
- Voice Dial
- Caller ID
- Call Progress Information
- Stereo audio play, stop, pause, forward, backward.
- Phonebook download

2. General Specification

Table 2: General Specification

Product	BlueTone™ Series Bluetooth Module
Model	FLC-BTMDC751
Bluetooth Specification	
Standard	Bluetooth2.1, Class II
Frequency Band	2.4~2.48GHz
Modulation Method	GFSK;PI/4-DQPSK;8DPSK
Maximum Data Rate	2.1Mbps
Hopping	1600hops/sec, 1MHz channel space
RF Input Impedance	50 ohms
Baseband Crystal OSC	16MHz
Interface	UART, PIO, AIO, USB, SPI, Speaker, Microphone
Profiles	A2DP, AVRCP, HS/HF, SPP, OBEX, detailed profiles depends on the firmware
Operation Range	10 meters (33 feet)
Sensitivity	-85dBm@0.1%BER
RF TX Power	0dBm
Connectivity	Point to Point
Audio Codec Specification	
Audio Codec	15bits
Audio SNR	>90dB
Audio Encryption	128bits
Dimension	
Dimension	23.7mmX12mmX2.2mm

Weight	1g
Power	
Supply Voltage	3.3v port: 2.7~3.6V DC
Working Current	Depends on profiles, 30mA typical when A2DP audio streaming
Standby Current	<0.5mA
Operation Environment	
Temperature	-40° C to +80° C
Humidity	10%~90% Non-Condensing
Certifications	BQB, RoHS

3. Pin Definition

3.1 Pin Configuration and Package Dimensions

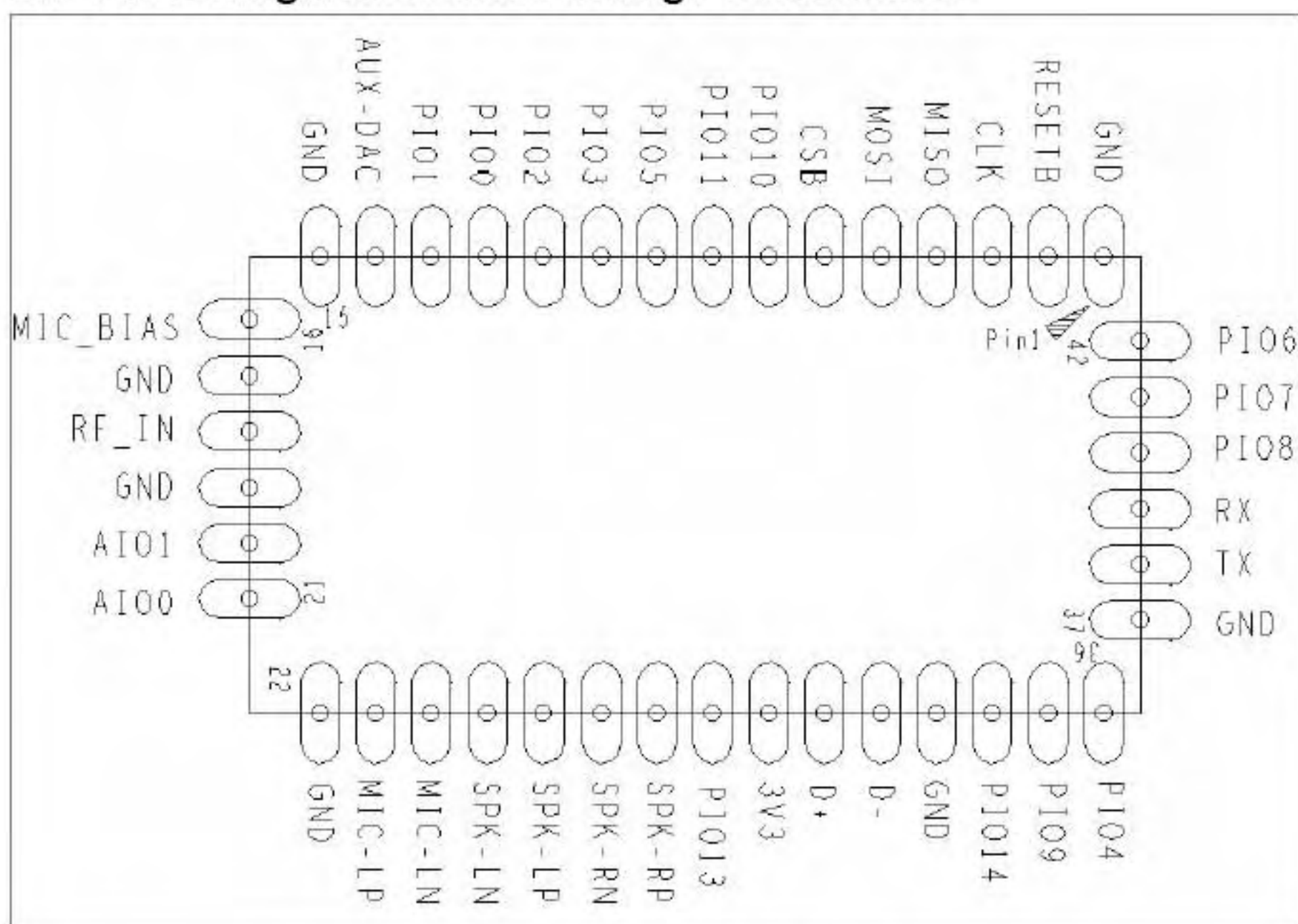


Figure 4 FLC-BTMDC751 pin definition

3.2 Pin Definition

Table 3: Pin Definition of FLC-BTMDC751

Pin	Symbol	I/O Type	Description
1	GND	Ground	Ground
2	RESETB	CMOS input with weak internal pull-up	Reset if low. Input debounced so must be low for >5ms to cause a reset
3	SPI_CLK	input with weak internal pull-down	Serial Peripheral Interface clock
4	SPI_MISO	CMOS output, tri-state, with weak internal pull-down	Serial Peripheral Interface output
5	SPI_MOSI	CMOS input, with weak internal pull-down	Serial Peripheral Interface input

6	SPI_CSB	CMOS input with weak internal pull-up	Chip select for Synchronous Serial Interface active low
7	PIO10	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
8	PIO11	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
9	PIO5	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
10	PIO3	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
11	PIO2	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
12	PIO0	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
13	PIO1	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
14	AUX_DAC	Analogue	Voltage DAC output
15	GND	Ground	Ground
16	MIC_BIAS	Analogue	Microphone Bias
17	RF_GND	RF Ground	RF Ground
18	RF_IN	Analogue	Transceiver input/output line
19	RF_GND	RF Ground	RF Ground
20	AIO1	Bi-directional	Analogue Programmable input/output line
21	AIO0	Bi-directional	Analogue Programmable input/output line
22	GND	Ground	Ground
23	MIC_LP	Analogue	Microphone input positive
24	MIC_LN	Analogue	Microphone input negative
25	SPK_LN	Analogue	Speaker output negative (left side)
26	SPK_LP	Analogue	Speaker output positive (left side)
27	SPK_RN	Analogue	Speaker output negative (right side)
28	SPK_RP	Analogue	Speaker output positive (right side)
29	PIO13	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
30	3V3	3.3v power input	3.3v power input
31	USB_D+	Bi-directional	USB data plus with selectable internal 1.5Kohm pull-up resistor
32	USB_D-	Bi-directional	USB data minus

33	GND	Ground	Ground
34	PIO14	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
35	PIO9	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
36	PIO4	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
37	GND	Ground	Ground
38	UART_TX	Bi-directional CMOS output, tri-state, with weak internal pull-up	UART data output
39	UART_RX	CMOS input with weak internal pull-down	UART data input
40	PIO8	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
41	PIO7	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
42	PIO6	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line

3.3 Electrical Characteristics

Table 4: Absolute Maximum Rating

Rating	Minimum	Maximum
Storage Temperature	-40°C	+150°C
PIO/AIO and UART_* Voltage	-0.4v	+3.7v
VCC Voltage	-0.4v	+28v
USB D+/D- Voltage	-0.4v	+5.6v

Table 5: Recommended Operating Conditions

Operating Condition	Minimum	Typical	Maximum
Operating Temperature Range	-40°C	--	+85°C
PIO/AIO and UART_* Voltage	+2.7V	+3.3V	+3.6V
3V3 Voltage	+2.7V	+3.3V	+3.6V
USB D+/D- Voltage	+4.4V	+5.0V	+5.3V

Table 6: Audio Output Terminal Characteristics

OutPut	Minimum	Typical	Maximum	Unit
Output power in 32ohm	-	30	-	mW pk
Output voltage full scale swing	-	2.0V	-	V pk-pk
Allowed load: resistive	16	-	O.C.	ohm
Allowed load: capacitive	-	-	500	pF

4. FLC-BTMDC751 Interfaces

4.1 Power Supply and Reset

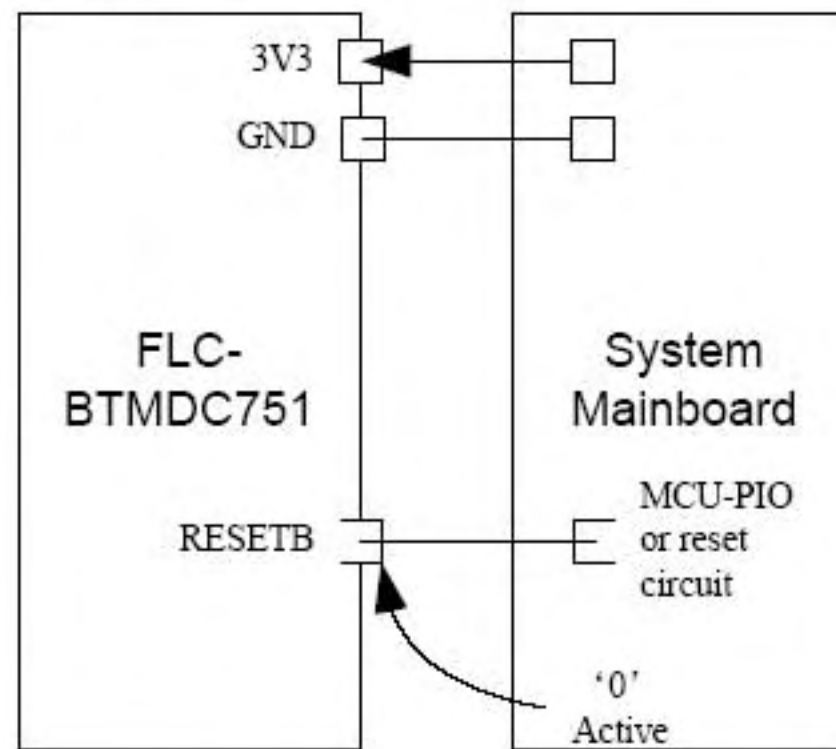


Figure 5 Design of Power Supply and Reset

4.2 RF

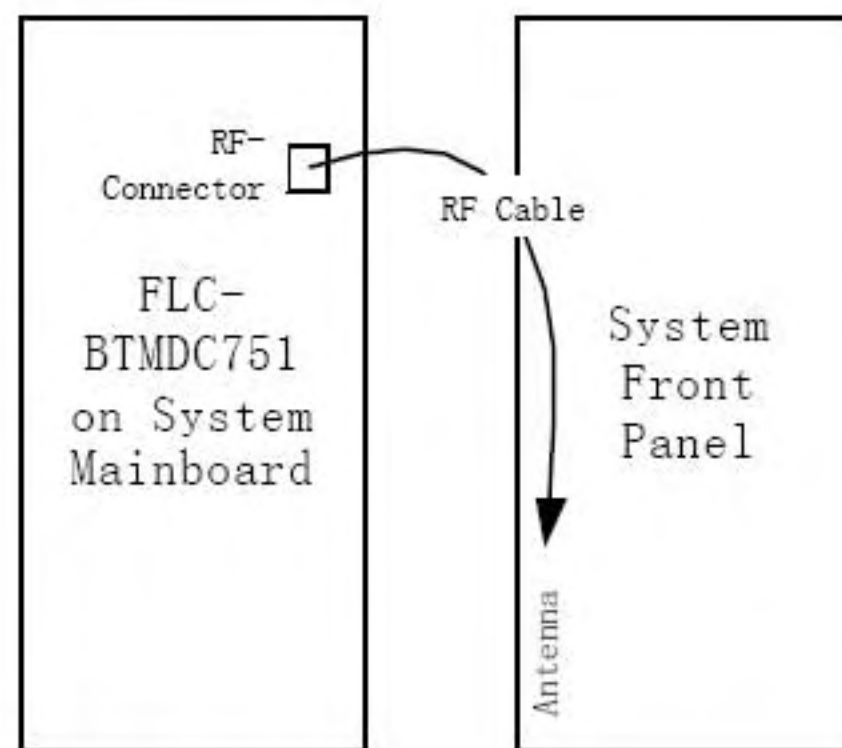


Figure 6 Scheme 1: Design of RF when mounting FLC-BTMDC751 on Mainboard

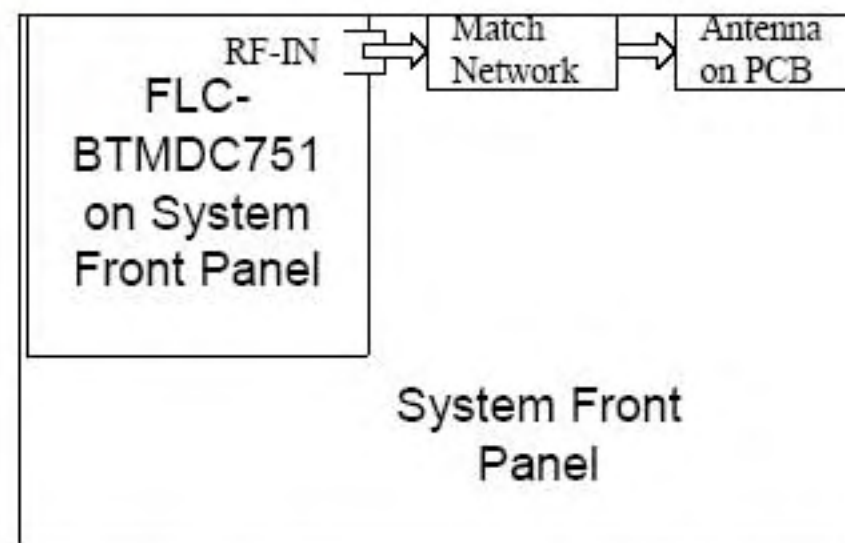


Figure 7 Scheme 2: Design of RF when mounting FLC-BTMDC751- on Front Panel

4.3 Audio

The FLC-BTMDC751 features a differential stereo audio output interfaces.

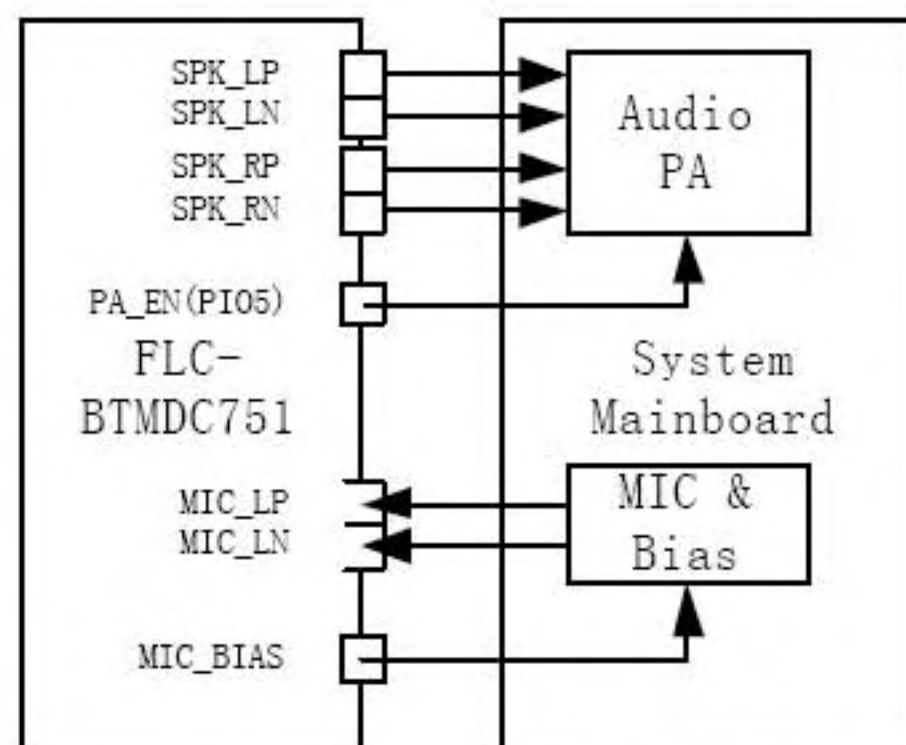


Figure 8 Scheme 1: Design of Audio Interfaces

4.4 UART Interface

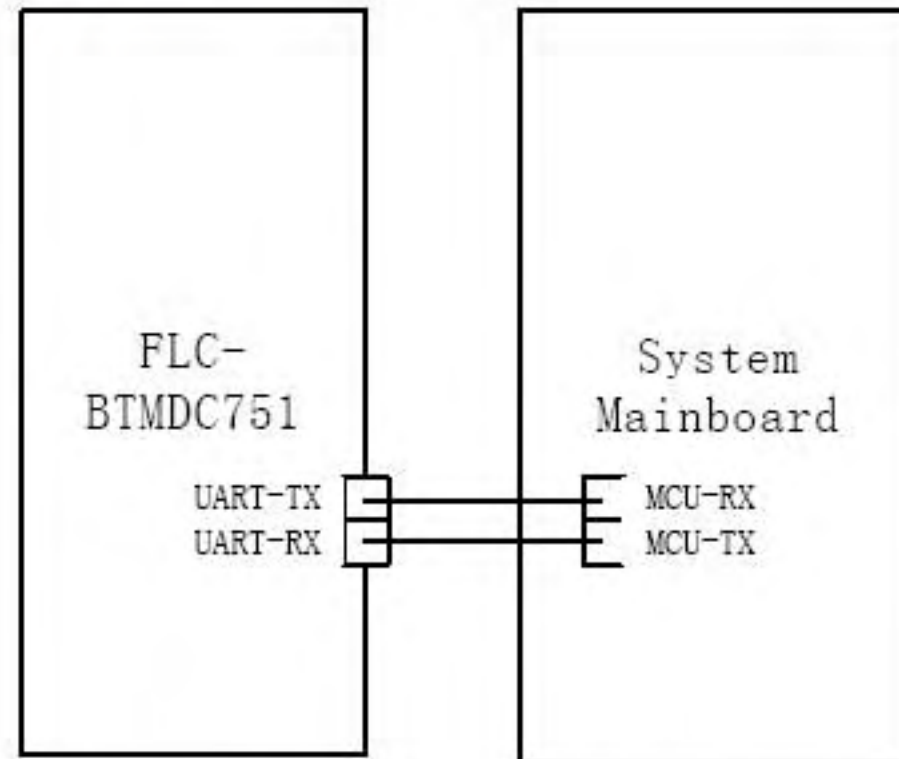


Figure 9 Design of UART

4.5 General Purpose Digital IO

There're several general purpose digital IO ports on the FLC-BTMDC751 module. Their functions depend on the firmware. Please also check the programming guide for details.

4.5.1 Button Interface

4.5.2 Control Interface for Audio Signals

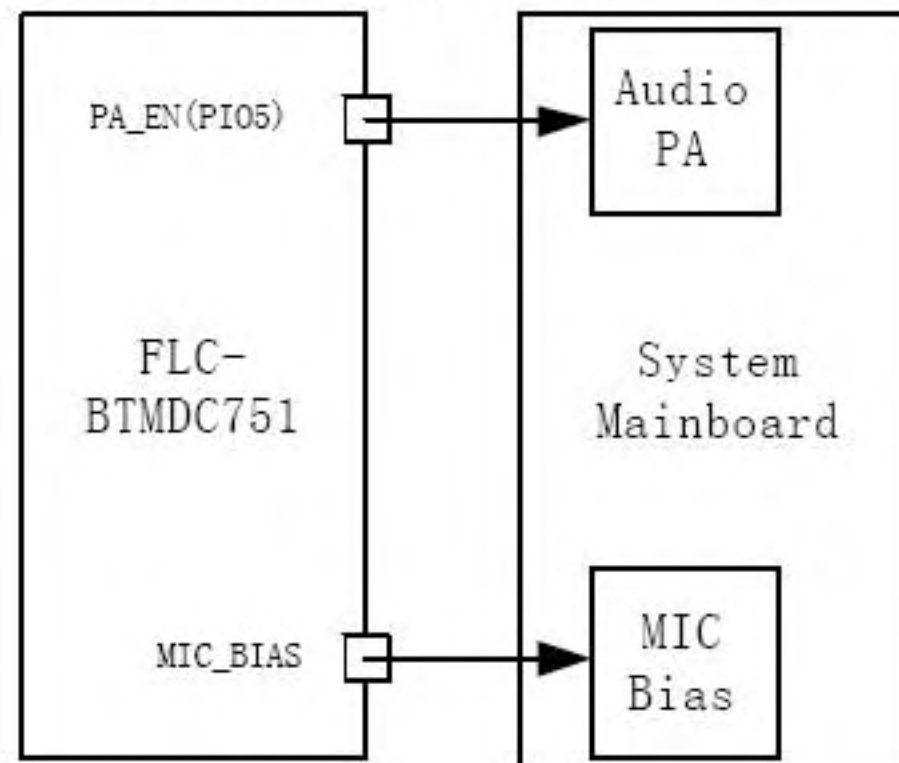


Figure 10 Design of General Purpose Digital IO

4.5.3 LED Interface

4.6 General Purpose Analogue IO

There're several general purpose analogue IO ports on the FLC-BTMDC751 module. Their functions depend on the firmware. Please also check the programming guide for details.

4.7 ISP Interfaces

The ISP (In System Programming) interfaces allows firmware update after the FLC-BTMDC751 module has been integrated in the customers systems. Flaircomm will update the firmware for Bluetooth functional upgrade, supporting of new mobile phone model, new requirement from customers and bug fix.

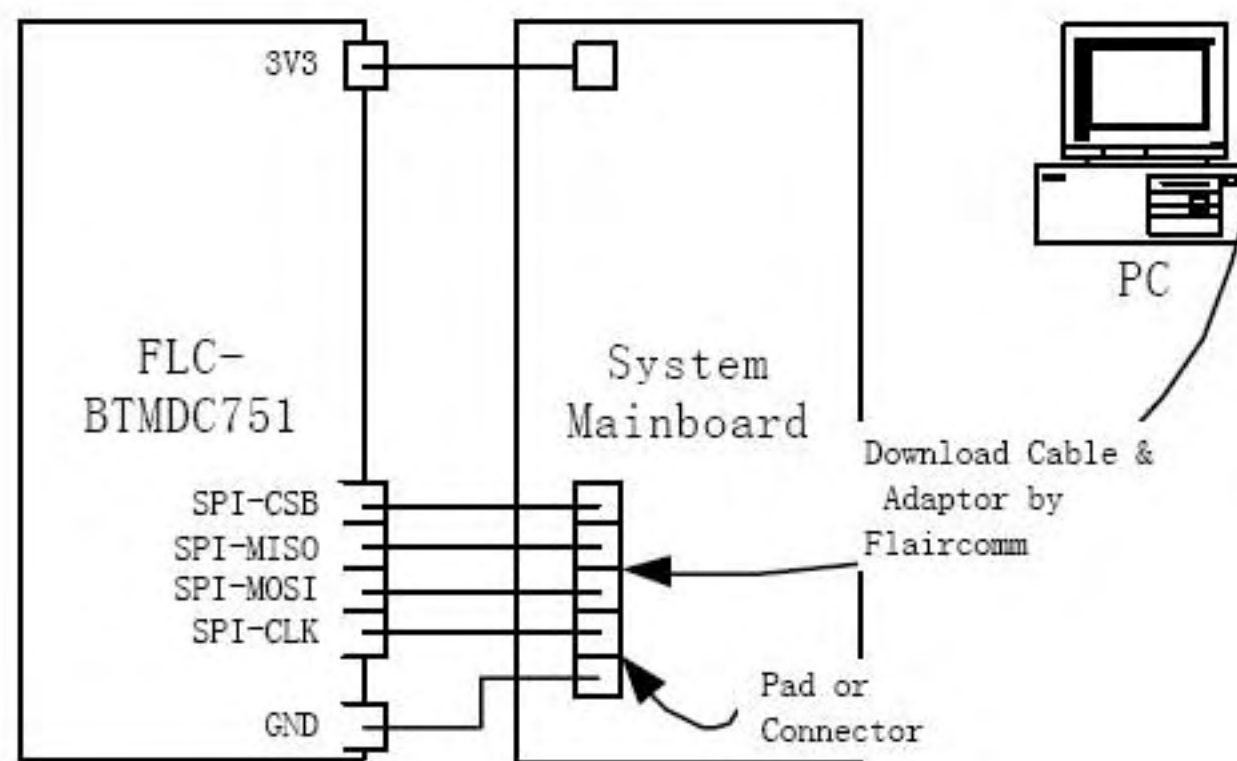


Figure 11 Design of ISP Interface

5. Recommended PCB Mounting Pattern

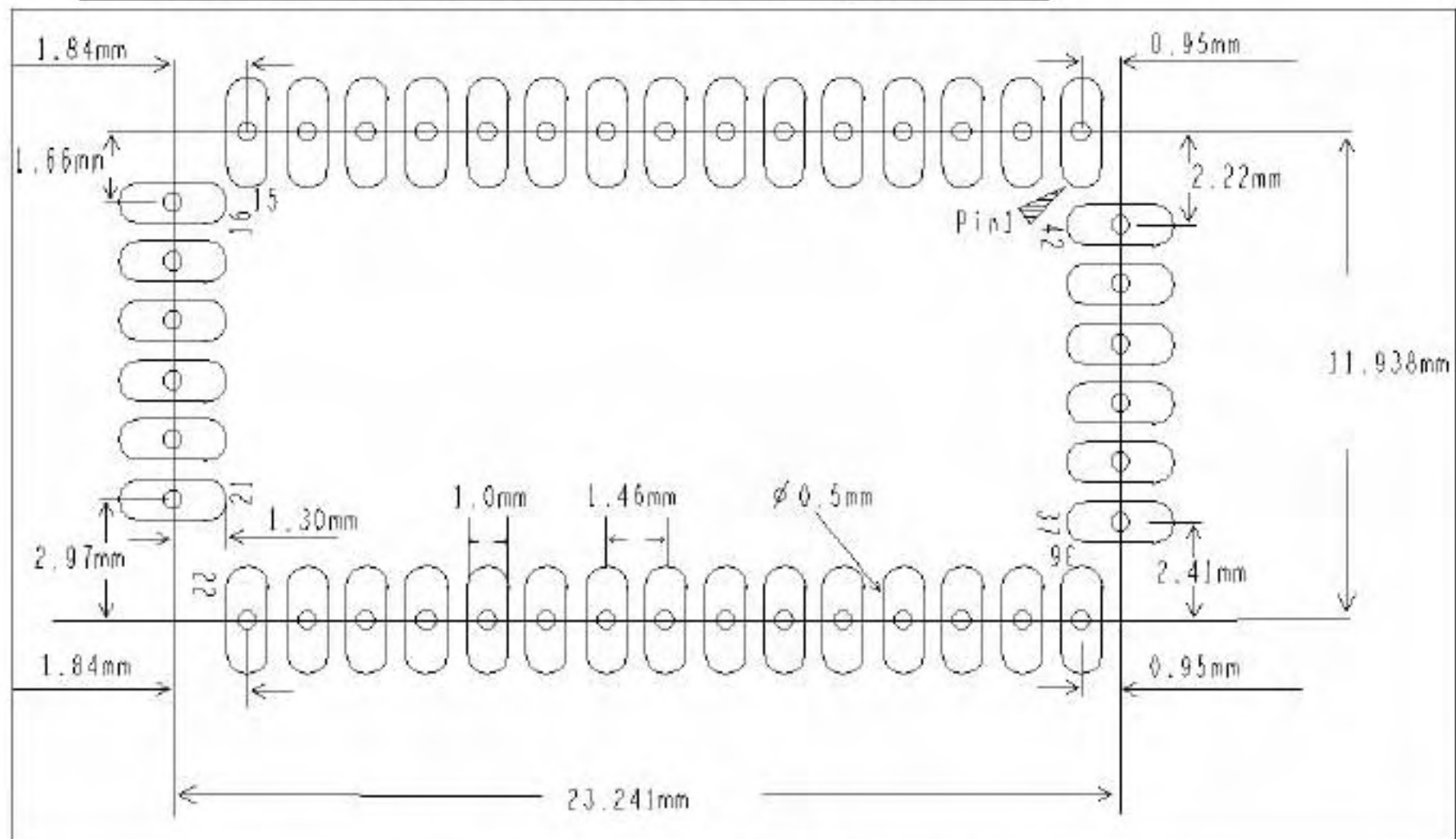


Figure 12 Recommended PCB Mounting Pattern

6. Application Schematic

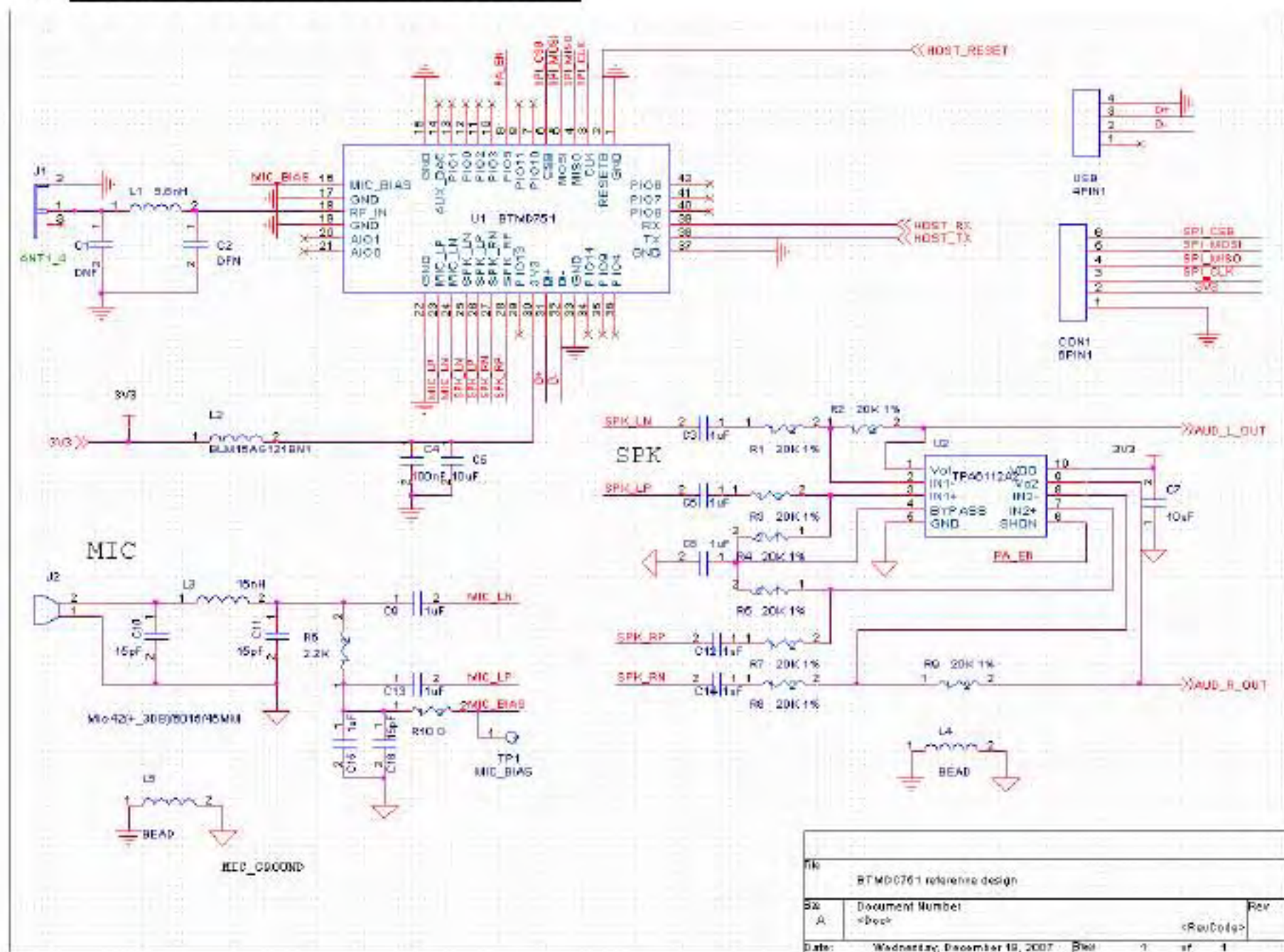


Figure 13 FLC-BTMDC751 Application Schematics

FCC STATEMENT

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.