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AK_BLUE_MODULE Specification

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Document Revision History

The following table provides revision history for this release. This history includes technical content revisions only and not stylistic or grammatical changes.

VERSION	DESCRIPTION	DATE COMPLETED
1.0.0	**Initial release**	2012-6-11

Contents

1 Introduction

AK_BLUE_MODULE is a high-performance Bluetooth audio module specially designed for Bluetooth-audio-applied products by Anyka Corporation. It features high integration, small size, excellent audio quality, and extremely low cost, and all its functions can be realized with only several peripherals.

This module integrates a RDA5876 Bluetooth processor and an AK1052 master processor, capable of connecting with any Bluetooth-audio-applied devices (like mobiles with Bluetooth and PC Bluetooth adapter) in compliance with A2DP and AVRCP to receive wireless high-quality stereo audio stream and control the audio player remotely. In addition, it boasts excellent audio codec function and rich APIs for user, such as keyboard API for remote control, working status indicator API and stereo audio output API etc.

The physical diagram of the module is shown as follows.

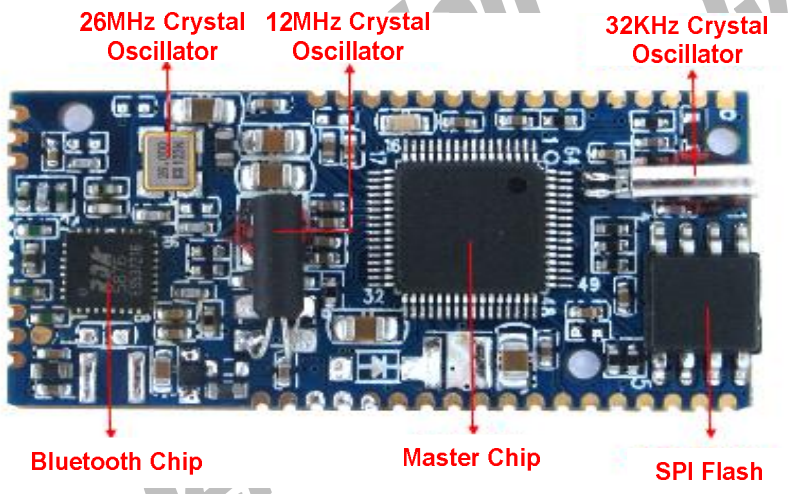

Figure 1-1

2 Features

- Class 2 power rating
- Compliance with V2.1+EDR Bluetooth Specification
- Support A2DP/AVRCP/GAVDP/IOPT/OPP/SPP
- Standard 2M SPI Flash with flexible configuration
- AIN Keyboard API
- LED indicator control API
- 2 channels of 22-bit DAC high-performance audio output
- 16-bit ADC stereo MIC/Line-in input
- Operation voltage: 4.75V~5.25V, supporting Lithium battery and power by USB
- Reserved IIC Interface
- SD Card Interface

3 Functional Block Diagram

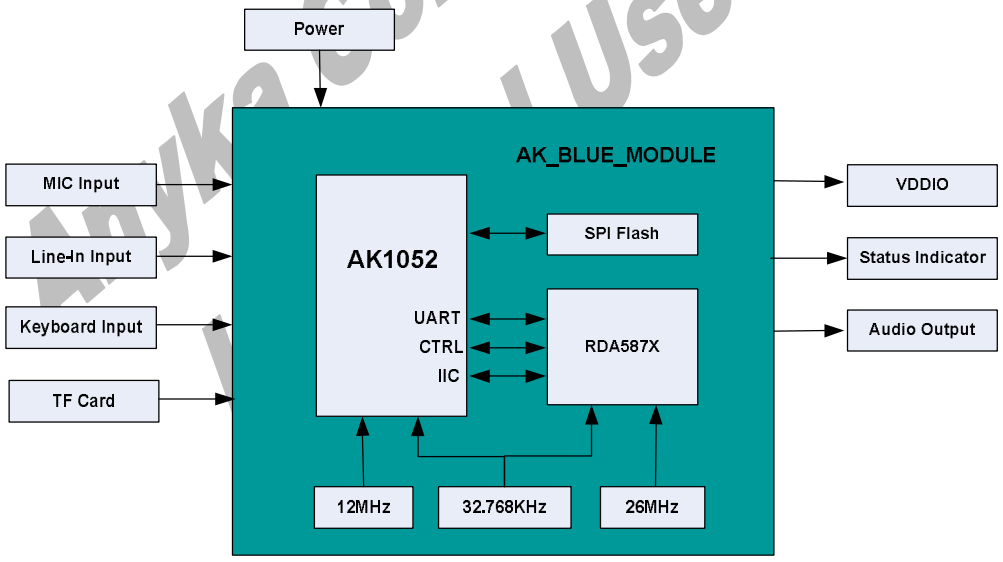

Figure 3-1

4 Dimension

Figure 4-1

- **u** PCB Size: 17mm*34.7mm
- **u** Weight: 4g
- **u** Bluetooth Communication Distance (Sight Distance Barrier-free): normal distance 10 meters, 20 meters at maximum
- **u** Support MP3/WMA/WAV/AMR audio decoder and lossless FLAC/APE decoder
- **u** Support MP3/WAV audio encoder

5 PIN Definition

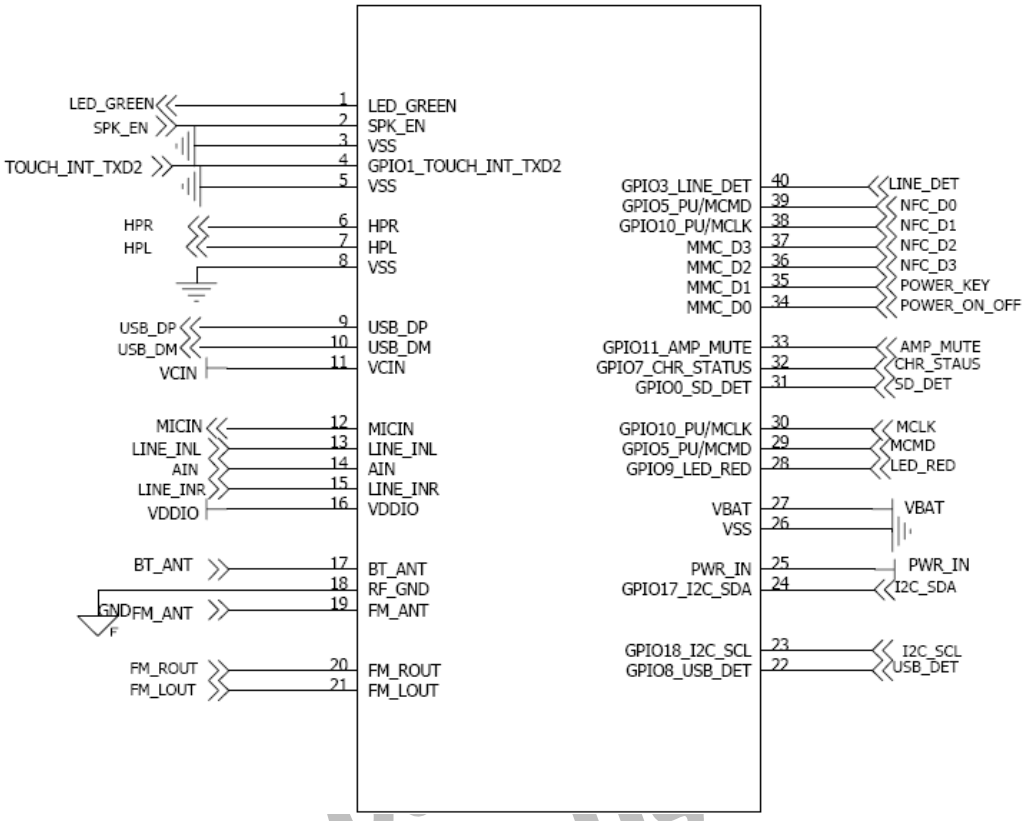

Figure 5-1

NO.	NAME	DESCRIPTION	NOTE
1	LED_GREEN	LED indicator controller	
2	SPK_EN	HP insertion and removal detection, and audio PA (Power Amplifier) enable	
3	GND	GND	
4	TOUCH_INT_TXD2	1） Analog Serial Port Output 2） Backed up for touch screen key interruption detection	
5	GND	GND	
6	HPR	HP right output	
7	HPL	HP left output	
8	GND	GND	
9	USB_DP	USB_DP data line	
10	USB_DM	USB_DM data line	

NO.	NAME	DESCRIPTION	NOTE
11	VCIN	MIC bias voltage	
12	MICIN	MIC input	
13	LINE_INL	Audio input left	
14	AIN	Analog keyboard input	
15	LINE_INR	Audio input right	
16	VDDIO	VDDIO power	
17	BT_ANT	Bluetooth Antenna Interface	
18	GND	GND	
19	FM_ANT	FM Antenna Interface	
20	FM_ROUT	FM audio output right	
21	FM_LOUT	FM audio output left	
22	USB_DET	USB detection	
23	I2C_SCL	I2C clock signal	
24	I2C_SDA	I2C data signal	
25	PWR_IN	Power input	
26	GND	GND	
27	VBAT	Battery voltage detection and power for RTC	
28	LED_RED	LED Indicator Control	
29	MCMD	SD Card Command	
30	MCLK	SD Card Clock	
31	SD_DET	SD Card Insertion and Removal Detection	
32	CHR_STAUS	Charge Status Indicator	
33	AMP_MUTE	Audio PA (Power Amplifier) Silence Function	
34	POWER_ON_OFF	Power on/off Detection	
35	POWER_KEY	Power on and keep signal open	
36	NFC_D3	SD Card Data Line	
37	NFC_D2	SD Card Data Line	
38	NFC_D1	SD Card Data Line	
39	NFC_D0	SD Card Data Line	
40	LINE_DET	LINE_IN Insertion and Removal Detection	

6 Power Consumption Indexes

Working Status	Power Index (mA)	Description	Note
line-in audio play	＜10		Indexes in this table are acquired through testing on sample Bluetooth speaker designed by Anyka Corporation, with a working voltage of DC 5.0V, HP load of 32Ω and medium volume.
TF card audio play	＜20	It may reach 25mA when playing APE and FLAC files.	
Bluetooth file transmission	＜50		
Bluetooth Stereo Audio Play	＜60		
FM	＜10		
MIC record	＜15	In format of WAV with a sampling rate of 8KHz	
line-in record	＜25	In format of MP3 with a sampling rate of 44.1KHz	

7 Bluetooth RF Characteristics

Transmitter	Units	Min	Typ	Max	Bluetooth Spec
RF Output Power	dBm	0	3	-	-6~4
RF Power Control Range	dB	30	-	-	>=16
Frequency Range	GHz	2.4	-	2.4835	2.4~2.4835
20Db Bandwidth for Moudulated Carrier	KHz	-	923	1000	<1000
2nd Adjacent Channel Power(+/-2MHz)	dBm	-	-50	-20	<=-20
3rd Adjacent Channel Power(+/-2MHz)	dBm	-	-53	-40	<=-40
Delta f1avg maximum modulation	KHz	140	164	175	140~175
Delta f2max minimum modulation(Threshold:115KHz)	%	99.9	100	-	99.9
Delat f2avg/Delatf1avg	-	0.8	0.97	-	>=0.8
ICFT	KHz	-75	-10	75	-75~75
Drift rate	KHz/50us	-	1	20	<=20
Drift(single slot packet)	KHz	-25	-3	25	-25~25
Drift(three&five slot packet)	KHz	-40	-3	40	-40~40
Receiver	Units	Min	Typ	Max	Bluetooth Spec
Sensitivity at 0.1% BER	dBm	-84	-80	-70	<=-70
Maximum Receiver Signal	dBm	-20	-10	-	>=-20

8 Application Circuit

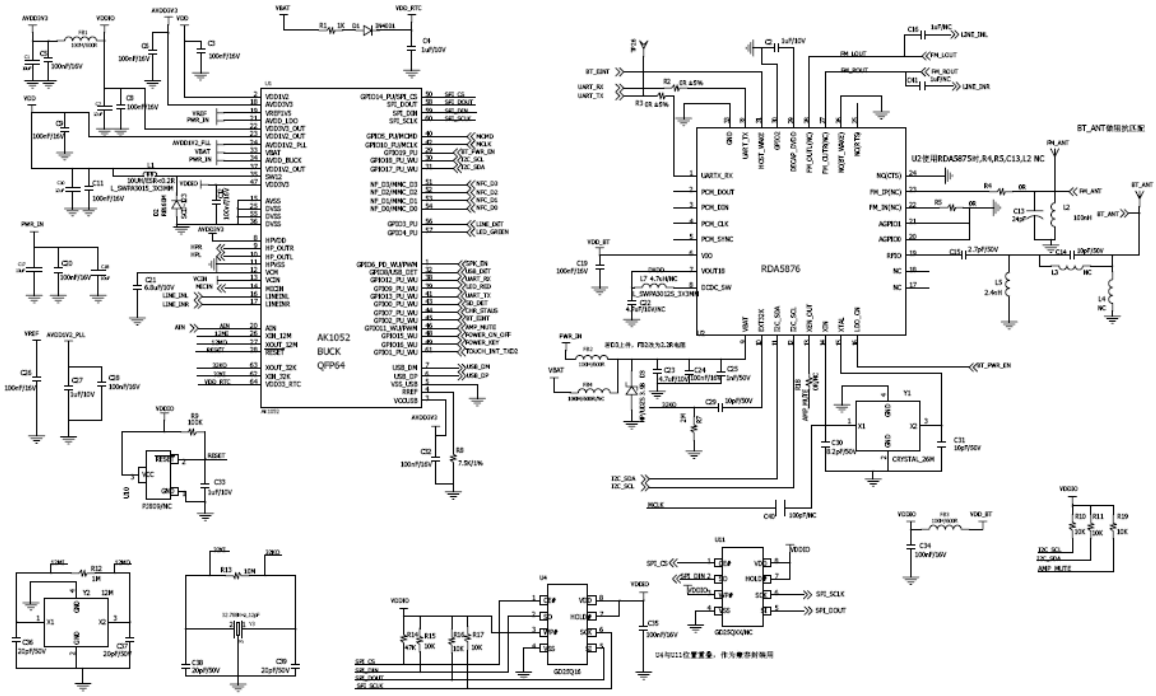

Figure 8-1

9 Limitations

- The file transmission speed through Bluetooth is less than 25KB/s at present.
- For some mobiles, fade-in/out function is not supported, causing POP noise when the music is being paused or switched.

10 Note

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.

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

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

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. The final end product must be labeled in a visible area with the following"Contains FCC ID:OADAK-BLUE-MODULE" The FCC part 15.19 statement below has to also be available in the label : The device complies with Part 15 of 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 is intended only for OEM integrators under the following conditions:

(1) According to FCC Part 15 Subpart C Section 15.212, the radio elements of the modular transmitter must have their own shielding. However, due to there is no shielding for this Bluetooth Module, this module is granted as a Limited Modular Approval.

(2) This module itself may not be marketed without the base board that contains the antenna. This device has been designed to operate with an PCB antenna built-in the base board having a maximum gain of 0dBi. Only this type of antenna may be used.

(3) Integration is typically strictly restricted to Grantee himself or dedicated OEM integrators under control of the Grantee.

As long as 3 conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions cannot 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 cannot 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.