MIPRO Electronics Co., Ltd.
Model number: KB64

KB64A/B/C
Bluetooth Module Datasheet

Revision 1.0.1
Mar. 2nd, 2018

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Revision History

Revision	Date	Description
V1.0.1	2018/Mar/2	Add external antenna pin of module
V1.0.0	2016/June/8	Initial release

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1. Introduction

The KB64A/B/C Bluetooth module built in a CSRA64110/CSRA64210/CRS64215 Bluetooth chip, is a perfect solution for consumer audio platform wired and wireless applications, integrates an ultra-low power DSP and application processor with embedded flash memory, a high performance stereo/mono codec, a powerful management subsystem, LED driver in a SoC. The enhanced Kalimba DSP coprocessor with 80MIPS supports enhanced audio and DSP applications.

The KB64A/B/C Bluetooth module complies with Bluetooth specification version 4.2. It supports HSP, HFP, A2DP, AVRCP profiles. It integrates RF, Baseband controller, etc. And it also provides UART interface, USB interface programmable I/O, mono (KB64A)/stereo(KB64B/KB64C) speaker output (Analog – differential, Digital – PCM, SPDIF & I²S), microphone input, etc. The KB64C is able to support aptX and aptX Low Latency.

2. Application

Mobile Speakers, earphones, microphones
High quality stereo wireless Headsets
Stereo Headphones
Automotive Hands-Free Kits
Wireless Speaker
TWS Speakers

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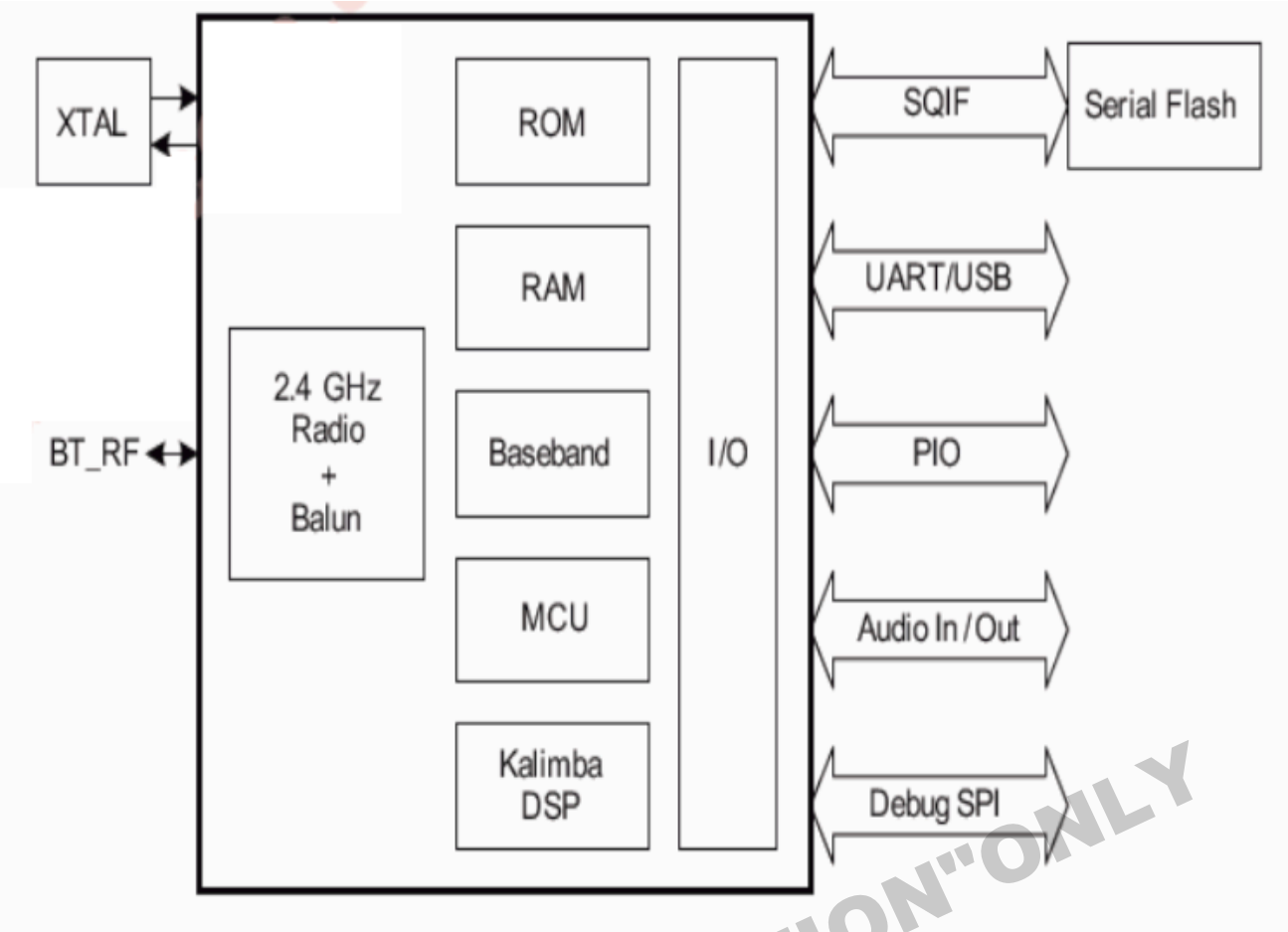

Fig 1. Block Diagram of KB64A/B/C series Bluetooth Module

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3. Specification

Model Name	KB64A/B/C		
Dimension	26mm x 14mm x 2.0mm		
Bluetooth Profile	A2DP v1.3, AVRCP v1.6, HFP v1.6, HSP v1.2, and DI v1.3		
Standard	Bluetooth® V4.2 Standard		
Frequency	2.402GHz ~ 2.480GHz unlicensed ISM band		
RF Channels	79 Channels		
Hopping	Adaptive Frequency Hopping (AFH)		
Modulation Method	Supports π/4 DQPSK and 8DPSK modulation		
Spread Spectrum	Frequency Hopping Spread Spectrum (FHSS)		
RF Output Power	Class II		
Tx Power	9dBm(typ)		
Rx Sensitivity	-90.5dBm		
Electrical Characteristics (Absolute Maximum Ratings)			
Symbol	Min	Max	Unit
VBAT	-0.4	4.2	V
CHARGE	-0.4	5.5	V
LED(0:1)	-0.4	4.4	V
PIO	-0.3	3.6	V
Recommended Operating Conditions			
VBAT	/	4.2	V
CHARGE	/	5	V
LED(0:1)	/	4.2	V
PIO	/	1.8	V
Operating Temperature Range	-10	70	Degree of C

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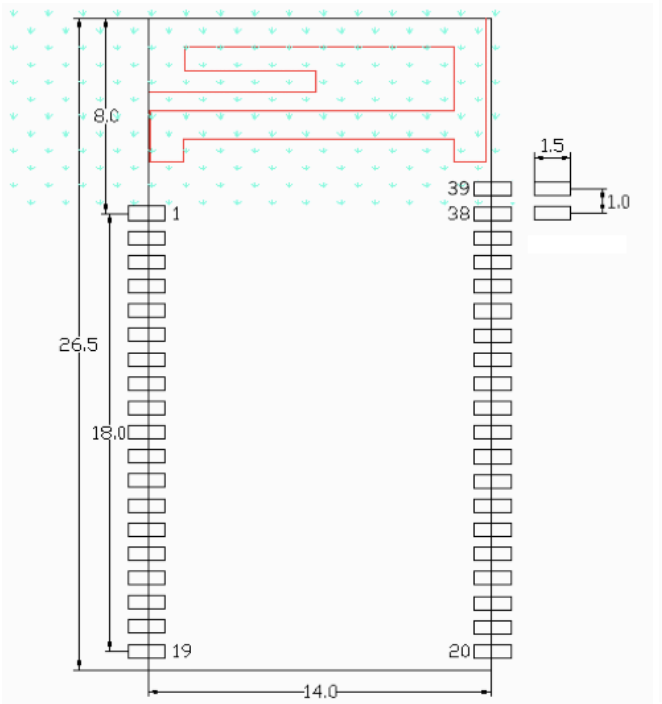
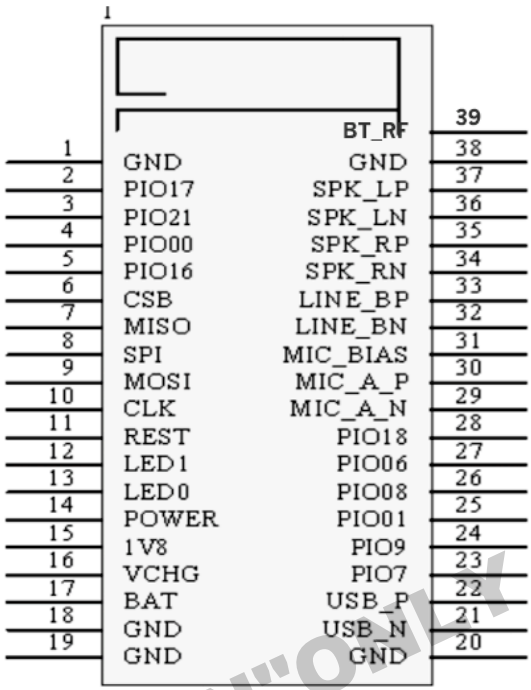
4. Pin Diagram and Dimension

Dimensions of module

BT module dimension: 26mm x 14.0 mm x 2.0 mm





Note: pin 39 only for KB64xE external rf antenna pin version

Fig 1. Pin Definition and dimension of KB64A/B/C

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5. Pin Description

Pin	Pin Name	I/O	Type	Description
1	GND		P	Ground connections
2	PIO17	I/O PD Strong	D	Programmable input/output line 17/ UART_CTS (active low)
3	PIO21	I/O PD Weak	D	Programmable input/output line 21
4	PIO00	I/O PU Strong	D	Programmable input/output line 0/ UART_RX / I2C_SCL
5	PIO16	I/O PU Strong	D	Programmable input/output line 16/ UART_RTC
6	CS#	I/O PD Weak	D	SPI_CS#: chip select for SPI, active low (for download)
7	MISO	I/O PD Weak	D	SPI_MISO: SPI data output (for download)
8	SPI_PCM	I PD Weak	D	SPI/PCM select input: 0 = PCM/PIO interface 1= SPI
9	MOSI	I/O PD Weak	D	SPI_MOSI: SPI data input (for download)
10	CLK	I/O PD Weak	D	SPI_CLK: SPI clock (for download)
11	RESET	I PU Strong	D	Reset if low. Pull low for minimum 5ms to cause a reset
12	LED1	I/O	D	LED driver
13	LED0	I/O	D	LED driver
14	MFB	I PD Weak	D	Regulator enable input
15	1.8V	P	P	+1.8V Output
16	VCHG	Charger input	P	Charger input
17	VBAT	Battery +	P	Battery positive terminal
18	GND	Ground	P	Ground connections
19	GND	Ground	P	Ground connections
20	GND	Ground	P	Ground connections
21	USB_DN	USB_DN	D	USB data minus
22	USB_DP	USB_DP	D	USB data plus with selectable internal 1.5kohm pull-up resistor
23	PIO07	I/O PD Weak	D	Programmable I/O line 7
24	PIO09	I/O PD Weak	D	Programmable I/O line 9/ UART_CTS (active low)
25	PIO01	I/O PD Strong	D	Programmable I/O line 1
26	PIO08	I/O PU Strong	D	Programmable I/O line 8/ UART_RTS (active low)
27	PIO06	I/O PD Strong	D	Programmable I/O line 6
28	PIO18	I/O PD Weak	D	Programmable I/O line 18
29	MIC_A_N	I	A	Line or microphone input negative, channel A
30	MIC_A_P	I	A	Line or microphone input positive, channel A
31	MIC_BIAS	I	A	Microphone bias
32	LINE_BN	I	A	Line input negative, channel B
33	LINE_BP	I	A	Line input positive, channel B
34	SPKR_RN	O	A	Speaker output negative, right, KB64A NC for mono
35	SPKR_RP	O	A	Speaker output positive, right, KB64A NC for mono
36	SPKR_LN	O	A	Speaker output negative, left
37	SPKR_LP	O	A	Speaker output positive, left
38	GND	Ground	G	Ground connections
39	BT_RF	A	A	External antenna pin (*only available for KB64xE)

Table 5-1 Pin description

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6. Design Note

Except KB64A, the KB64B/C is design for stereo speaker output, SPKR_RN, SPKR_RP, SPKR_LN, SPKR_LP are output for stereo audio output. If it connects with amplifier, it must be differential input. Or, it must have a component to balance two signal levels different. Otherwise, it will cause pop noise. You could refer the reference schematic for more detail. When using KB64A, please not connect the SPKR_RN, SPKR_RP for mono output SPKR_LN, SPKR_LP only.

For PCB layout, the metal material will affect the antenna of Bluetooth. Please keep the blow area of antenna as open, without ground or line. Please keep antenna distance with the battery, speaker and display monitor etc.

The Bluetooth communication is easy depends on environment. For example, The workable distance sometime shorter when in different environment because signal absorb by the metal or wood as obstacle.

If your design must put the KB64A/B/C in the metal shell or box, it should connect with higher performance external antenna for better signal. There are an external antenna option versions for you to apply the external antenna by BT_RF pin. The option is only for KB64xE version, For example, KB64AE, KB64BE or KB64CE. The E is mean external antenna version. Please let us know you application before you put the order.

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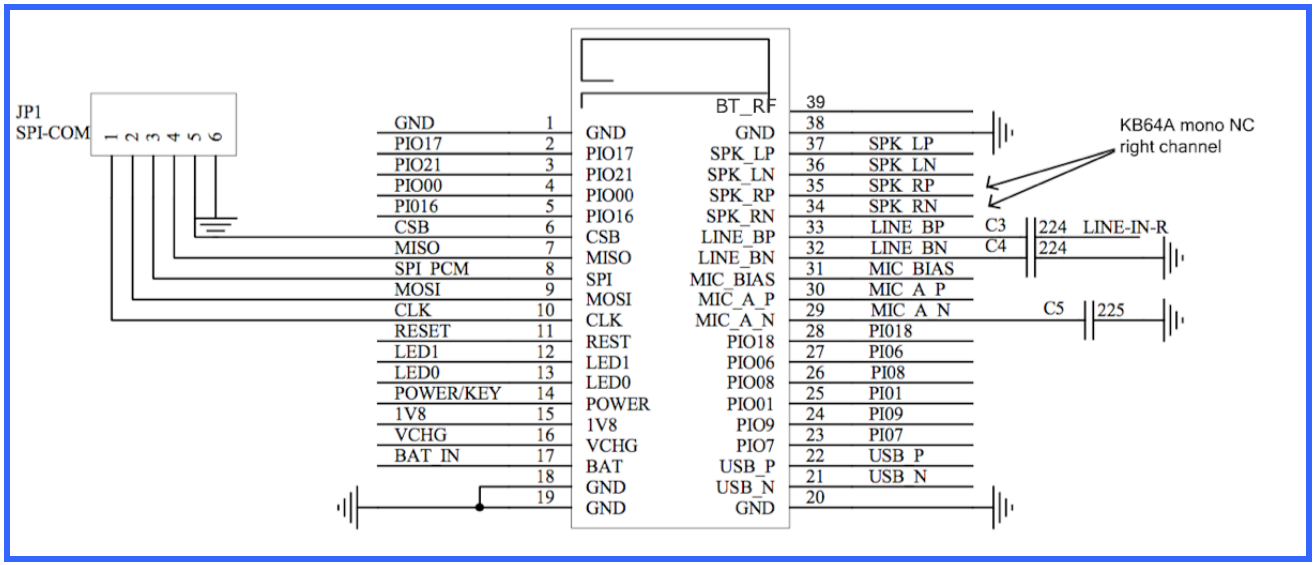
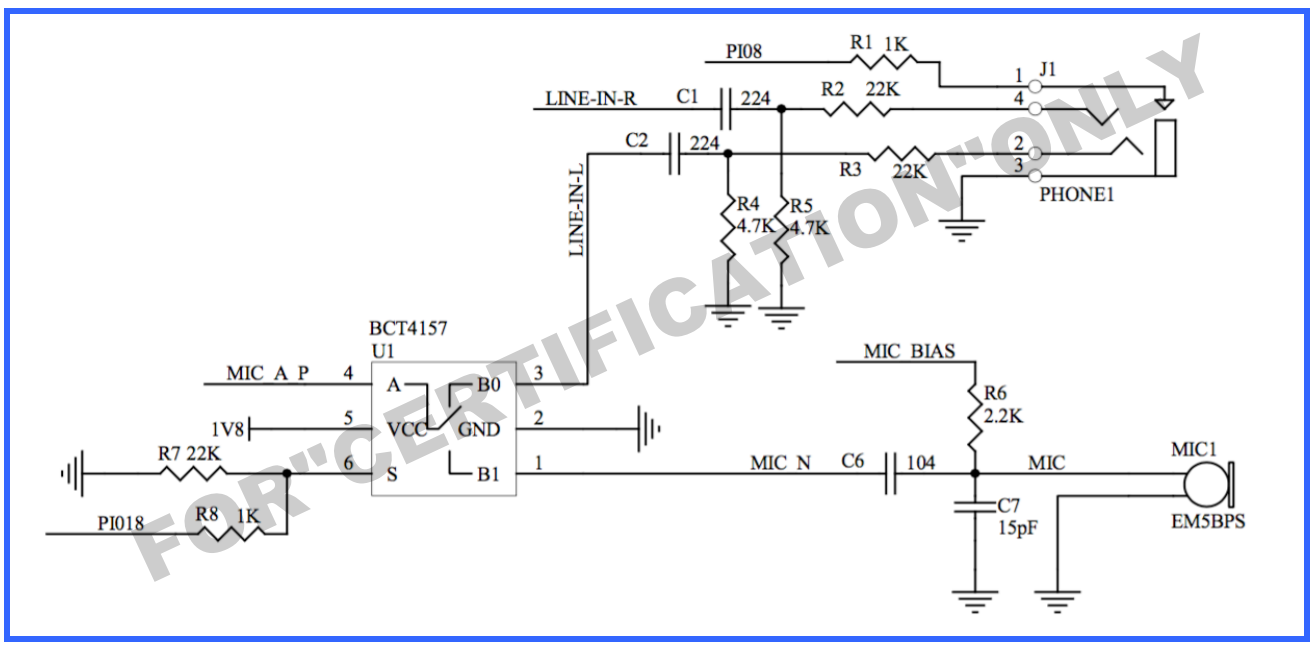
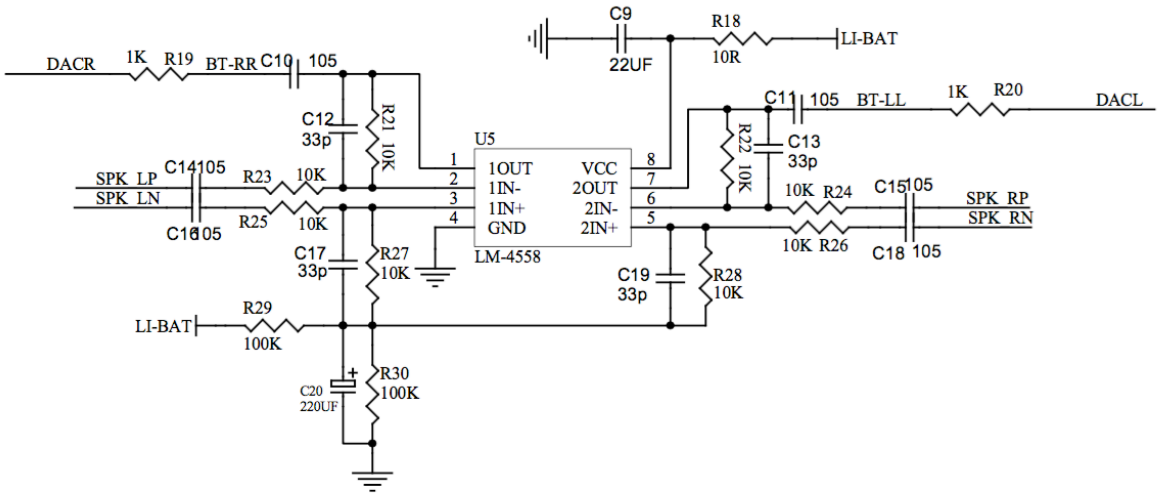
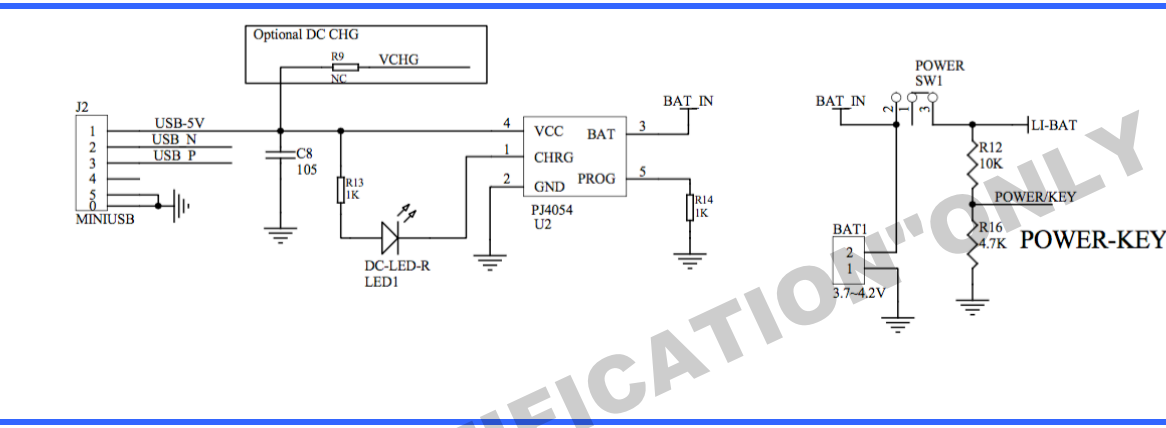
7. General Application Schematic



Note: pin 39 only available for KB64xE external RF antenna pin version







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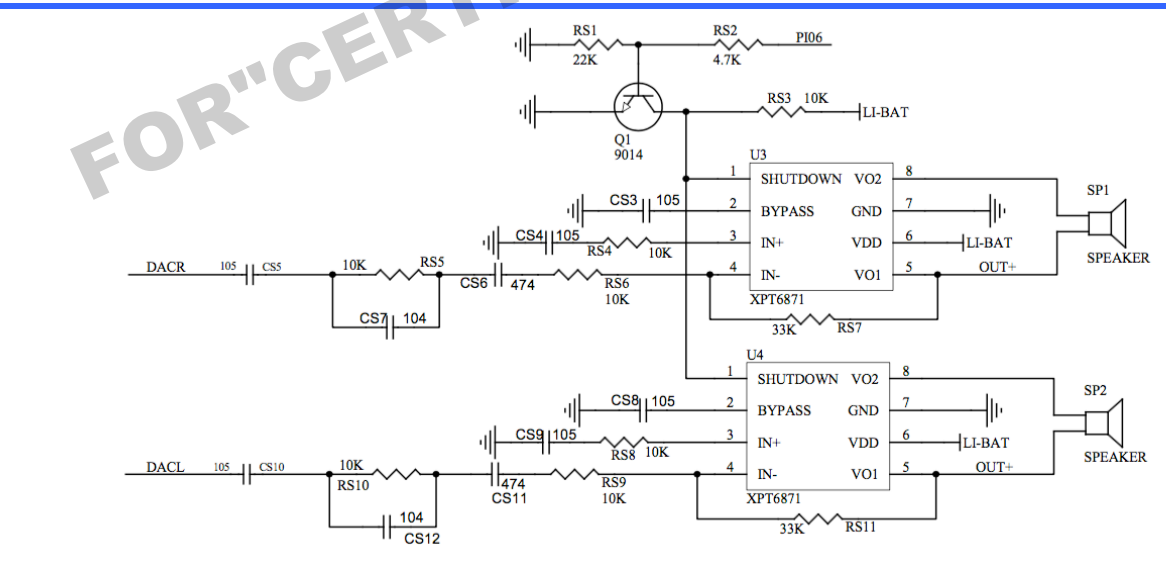

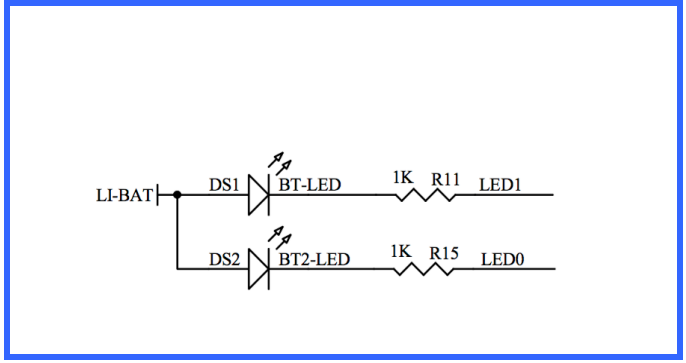

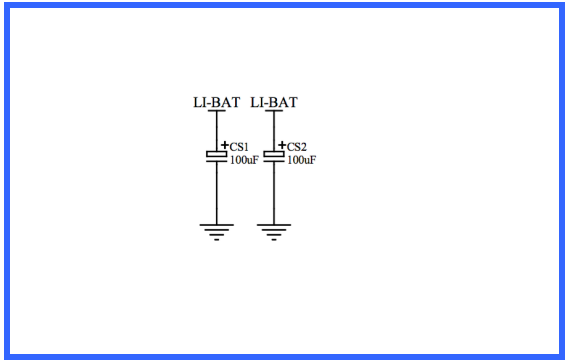

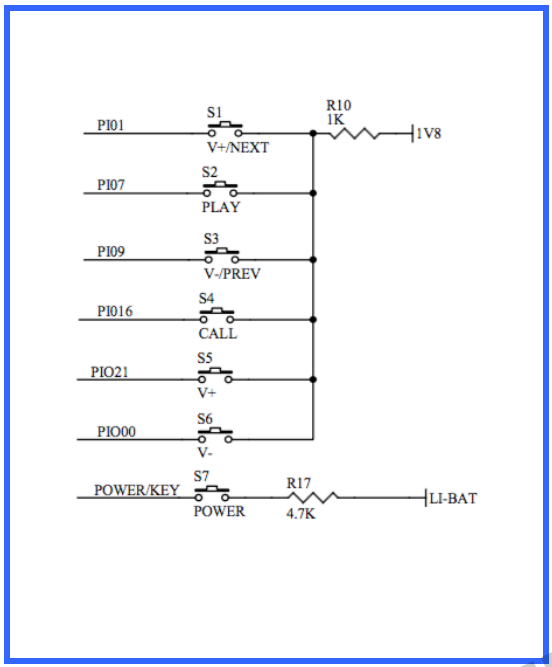

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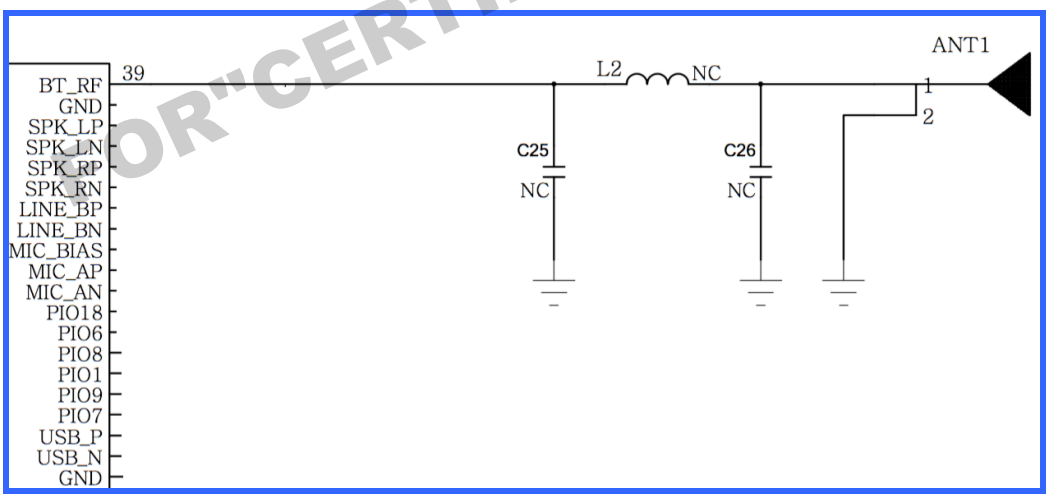

Note: pin 39 only available for KB64xE external RF antenna pin version

Fig 2. Reference Schematic of KB64A/B/C

8. DISCLAIMER

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Federal Communication Commission Interference Statement

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 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.
FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

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End Product Labeling

This transmitter module is authorized only for use in devices where the antenna may be installed such that 0.5 cm may be maintained between the antenna and users. The final end product must be labeled in visible area with the following: “Contains FCC ID: M5X-KB64ABC”

End Product Manual Information

The user manual for end users must include the following information in a prominent location “IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 0.5 cm from all persons and must not be colocated or operating in conjunction with any other antenna or transmitter.” 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.

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or colocation 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 reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.
This device is intended only for OEM integrators under the following conditions: The antenna must be installed such that 0.5 cm is maintained between the antenna and users. As long as a condition above is 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.).