



Inkel Corporation

Operating Instructions

# Bluetooth Module for Audio

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Bluetooth Module

Model: MB8811C1

Operating Instructions

**OEM/Integrators Installation Manual**

## General Description

MB8811C1 is a fully integrated Bluetooth module. It is based on CSR's Bluecore 8811 chip with specific interface design to meet Inkel Corporation's needs.

MB8811C1 is compatible with Bluetooth specification version 4.0. It integrates RF, Baseband controller, etc., a completed Bluetooth subsystem.

## Features

- Dual-mode Bluetooth / Bluetooth low energy radio
- Stereo codec with 2 microphone inputs
- Fast Charging support up to 200mA with no external components
- Multipoint support for A2DP connection to 2 A2DP source for music playback
- aptX, SBC, MP3, AAC and Fast stream decoder
- Built-in Reference Clock: 26MHz
- RoHS Compliant

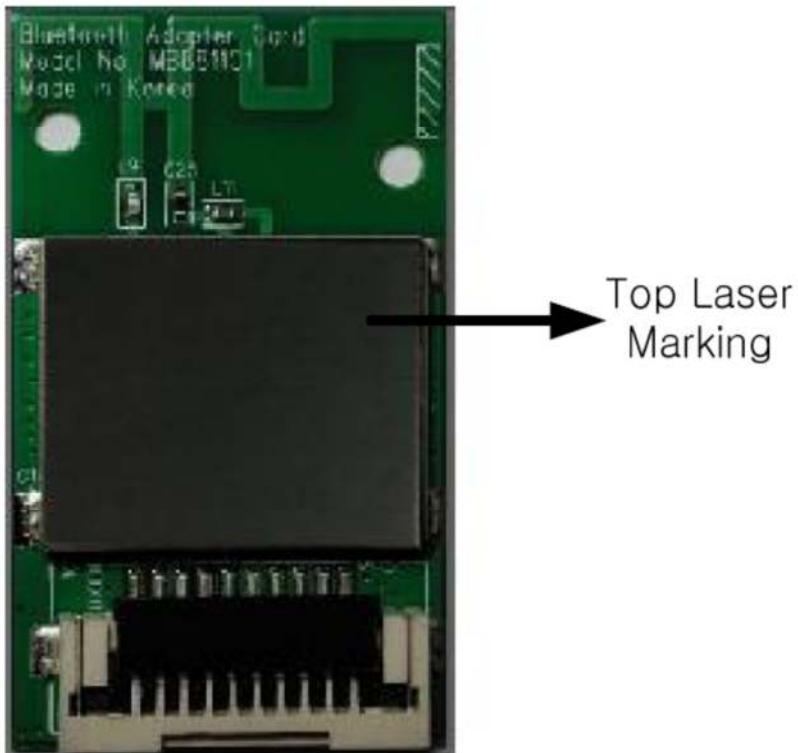
## Applications

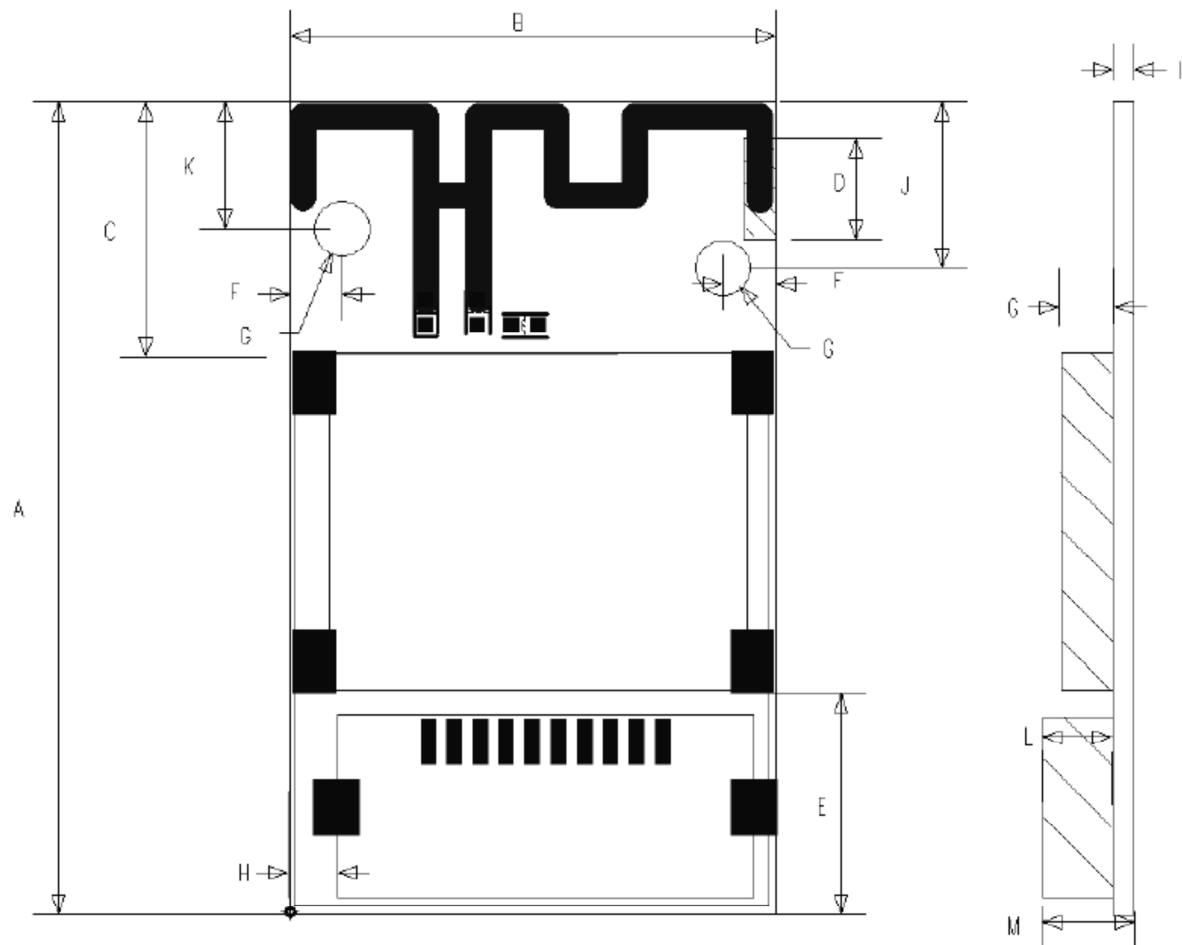
- Stereo headsets
- Wired stereo headset and headphones
- Portable stereo speakers
- Audio Products

## Pattern Antenna

- Frequency Range : 2400 ~ 2500 MHz
- Peak Gain(MAX) : 1.396 dBi

## Device Overview

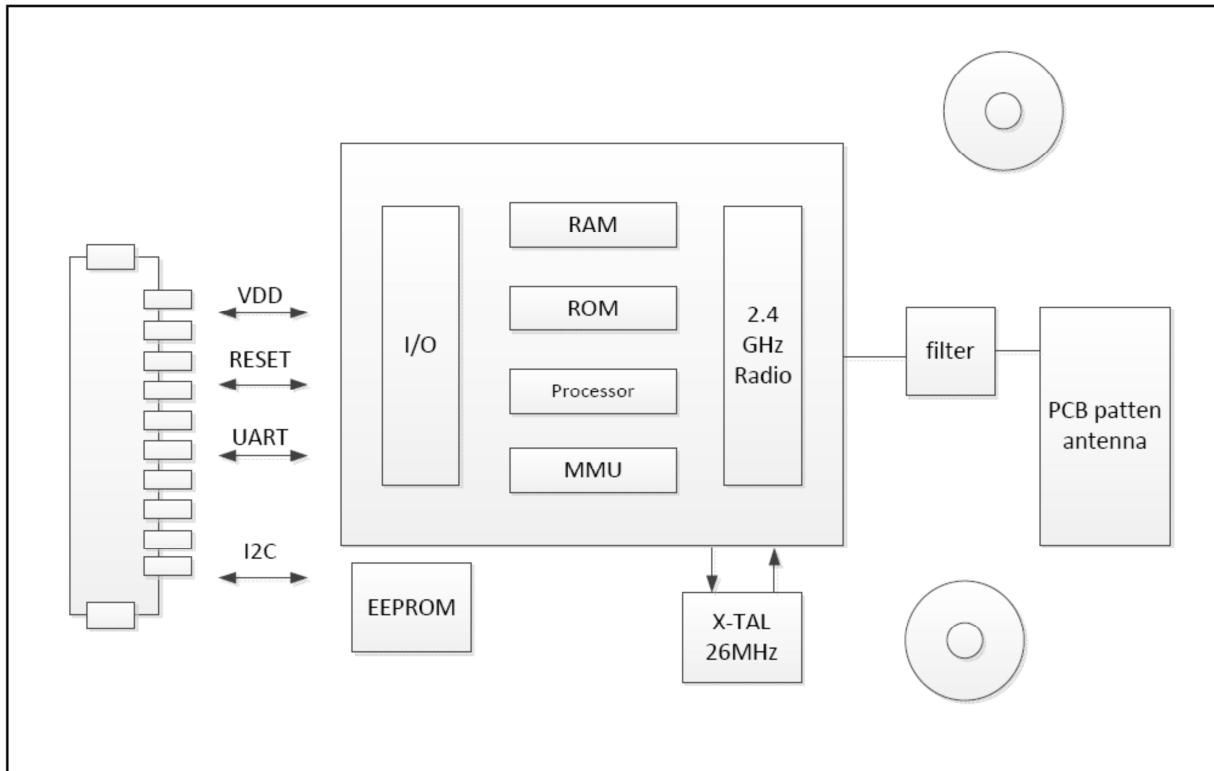


**Dimensions****TOP View**

Mark	Dimension	Mark	Dimension	Mark	Dimension	Mark	Dimension	Mark	Dimension
A	$31.20 \pm 0.3$	D	$3.90 \pm 0.2$	G	$2.0 \pm 0.2$	J	$6.4 \pm 0.2$	M	$3.4 \pm 0.2$
B	$18.60 \pm 0.3$	E	$8.40 \pm 0.2$	H	$1.9 \pm 0.2$	K	$4.9 \pm 0.2$		
C	$9.70 \pm 0.3$	F	$2.0 \pm 0.3$	I	$0.8 \pm 0.1$	L	$2.6 \pm 0.2$		

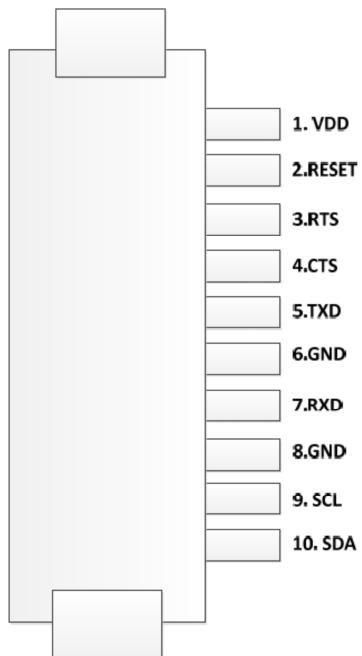
(Unit : mm)

## Block Diagram

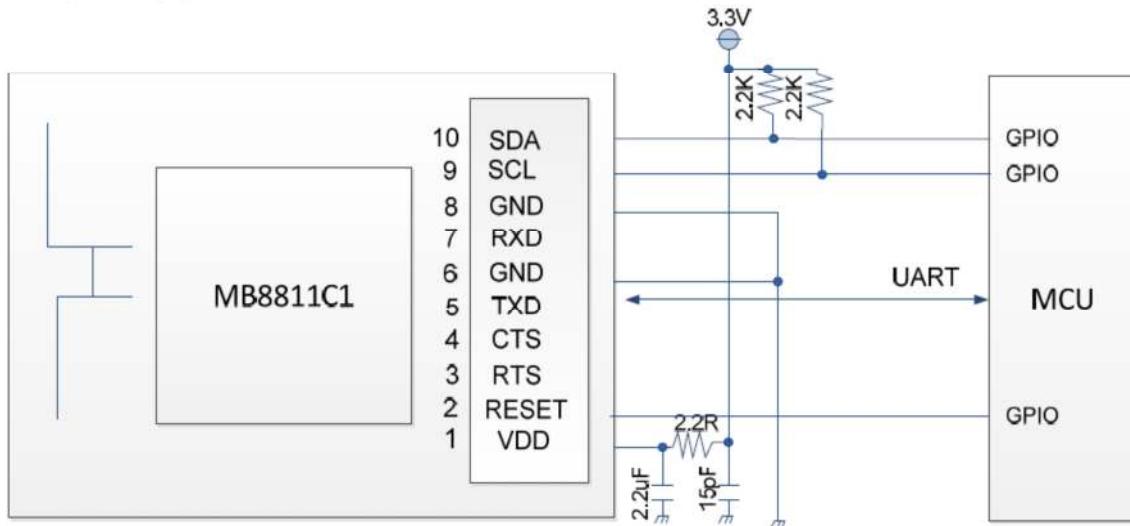


## Pin Descriptions

No	Pin Name	I/O	Description
1	VDD	I	Positive Input for the internal regulator (3.0 ~ 3.6V)
2	RESET	I	Reset if low. Input debounced so must be low for >5ms to cause a reset
3	RTS	O	Bluetooth UART Request to Send. Active-low request.
4	CTS	I	Bluetooth UART Clear to Send.Active-low clear.
5	TXD	O	Bluetooth UART Serial Output.
6	GND	-	Ground.
7	RXD	I	Bluetooth UART Serial Input.
8	GND	-	Ground
9	SCL	O	I2C interface Clock
10	SDA	I/O	I2C interface DATA



## Example Application schematic



## Electrical Characteristics

Conditions : VDD = 3.3V, Ta = 25 °C, unless otherwise noted.

### Absolute Maximum Ratings

Parameter	Min	Max	Unit
Power Supply Voltage : VDD	-0.4V	3.6V	DCV
Storage Temperature	-40	85	°C

### Recommended Operating Conditions

Parameter	Min	Max	Unit
Power Supply Voltage	3.0V	3.6V	DCV
Operation Temperature	-10	70	°C

### Current consumption

Parameter	Connection Type	Avg	Peak	Unit
Page scan, Time interval = 1.28s	-	2		mA
Inquiry and Page scan, Time interval = 1.28s	-	2	3	mA
ACL No data transfer	Master	10		mA
ACL data transfer	Master	32		mA

### Input/Output Characteristics

Parameter	Min	Max	Unit
V <sub>IL</sub> Input Voltage Low	-0.4	0.8	V
V <sub>IH</sub> Input Voltage High	0.7*VDD	VDD+0.4	V
V <sub>OL</sub> Output Voltage Low	-	0.2	V
V <sub>OH</sub> Output Voltage High	VDD-0.2	-	V

**General Performance**

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range	Normal	2402	-	2480	MHz

**Transmitter Performance**

Parameter	Condition	Min	Typ	Max	Unit
Transmit Power	Normal	-6	0	8	dBm
Power density	Normal	-	-	20	dBm
20dB bandwidth	Normal			1000	KHz
Adjacent channel power ( $F_0 = 2441\text{MHz}$ )	$F=F_0 \pm 2\text{MHz}$	-	-	-20	dBm
	$F=F_0 \pm 3\text{MHz}$	-	-	-40	dBm
	$F=F_0 \pm 4\text{MHz}$	-	-	-40	dBm
Out-band Spurious Emission	30MHz ~ 1GHz	-	-	-36	dBm
	1GHz ~ 12.75GHz	-	-	-30	dBm
	1.8GHz ~ 1.9GHz	-	-	-47	dBm
	5.1GHz ~ 5.3GHz	-	-	-47	dBm
Modulation Characteristic	$\Delta F_{1\text{avg}}$	140	-	175	KHz
	$\Delta F_{2\text{max}}$	115	-	-	KHz
	$\Delta F_{2\text{avg}} / \Delta F_{1\text{avg}}$	80	-	-	%
Initial Carrier Frequency Tolerance	DH1 packet	-75	-	75	KHz
Carrier Frequency Drift	DH5 packet	-25		25	KHz

**Receiver Performance**

Parameter	Condition	Min	Type	Max	Unit
Sensitivity at 0.1% BER	Single slot (DH1 packet)	-70	-	-	dBm
Sensitivity at 0.1% BER	Multi slot (DH5 packet)	-70	-	-	dBm
Maximum received signal at 0.1% BER		-20	-	-	dBm
Maximum level of intermodulation interferers	$f_1-f_2 = 5\text{ MHz}$ , $P_{\text{wanted}} = -64\text{ dBm}$	-39	-	-	dBm

## Module's Label Information



[Top Silk]



[Bottom Silk]



**Regulatory****USA**

**NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.**

The MB8811C1 module has been labeled with its own FCC ID number, and if the FCC ID is not visible when the module is installed inside host audio device. Then the outside of the finished product into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording as follows:

This device complies with Part 15 of the FCC Rules. Operation is subject 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

A user's manual for the product should include the following statement

**FCC Information to User**

**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.

**CANADA****IC**

The MB8811C1 module has been labeled with its own IC number, and if the IC is not visible when the module is installed inside host audio device.

Then the outside of the finished product into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording as follows:

A user's manual for the product should include the following statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

**EUROPE****CE**

Hereby declares that this Bluetooth module is in compliance with the essential requirements and other relevant provisions of R&TTE Directive 1999/5/EC. The standards for complying are as following:

ETSI EN 301 489-1 V1.9.2: 2011-09

ETSI EN 301 489-17 V2.2.1: 2012-09

ETSI EN 300 328 V1.9.1:2012-06

EN 62479: 2010

EN 60065:2002 + A1:2006 + A11:2008 + A2:2010+A12:2011

This is a class B product. In a domestic environment, this product may cause radio interference,

in which case the user may be required to take adequate measures.

This is a class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

This device is intended for home and office use in all EU countries

## KOREA



해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다  
B 급 기기 ( 가정용 방송통신기자재 )

이 기기는 가정용 (B 급) 전자파적합기기로서 주로  
가정에서 사용하는 것을 목적으로 하며, 모든  
지역에서 사용할 수 있습니다

해당 무선설비는 운용 중 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수  
없습니다.

## TAIWAN



### 第十二條

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、  
加大功率或變更原設計之特性及功能。

### 第十四條

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停  
用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信法規定作業之無線電通信。

低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

**Manufacturer:****Inkel Corporation**

93, Cheongjung-ro, Bupyeong-Gu, Incheon, 403-853, Republic of Korea

Tel: 82-032-650-6000

**Manual Information To the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

**IMPORTANT NOTE:** that the module is limited to installation in mobile or fixed applications, If it is infringe 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.

**FCC Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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

**End Product Labeling**

The final end product must be labeled in a visible area with the following: "Contains FCC ID:VNH-MB8811C1". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

**Radiation Exposure Statement:**

The product comply with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

***"Inkel Corporation will provide guidance to the host manufacturer for compliance issues with Part 15 Subpart B compliance if needed."***