

## Technical Description

The brief circuit description is listed as below:

- 1) U3 acts as 2.4GHz RF Transceiver (EM9201).
- 2) U1 acts as MCU (SNC82340).
- 3) U2 acts as Voltage Regulator (6206).
- 4) Y1 (16.384MHz) and Y2 (32.768kHz) act as Crystal Oscillator for U1.
- 5) X1 (26MHz) acts as Crystal Oscillator for U3.
- 6) S1 to S22 act as Control Buttons.
- 7) D5 act as LEDs.
- 8) LS1 acts as Speaker.
- 9) U4 acts as a motor driver.
- 10) M1 acts as a motor.

**Antenna Type: Internal antenna**

**Antenna Gain: 0dBi**

**Nominal rated field strength: 88.6 dB $\mu$ V/m at 3m**

**Maximum allowed field strength of production tolerance: +/- 3dB**

# CMM-9201/9203-V7.4

## Mini 2.4GHz Transceiver Module



### Description

The CMM-9201 module is a miniaturised 2.4GHz transceiver module based on EM Microelectronic's low energy RF transceiver EM9201/03. The module is highly optimized for proprietary link application requiring ultra low power consumption and short time-to-market. It offers a plug and play solution for any EM9201 application without any additional hardware nor RF layout. Built in with a folded-dipole PCB antenna, this small sized, low cost module provides an ideal solution to wireless 2.4GHz license-free application worldwide.

The EM9201/03 is a low-voltage 2.4GHz transceiver IC with built-in link-layer logic permitting proprietary wireless links in the 2.400 ... 2.4835 GHz ISM band. It has a radio core with a low-IF architecture and GFSK modulation scheme being compliant with the emerging Bluetooth low energy technology standard..

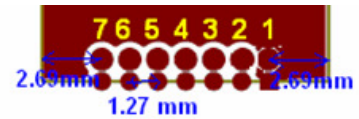
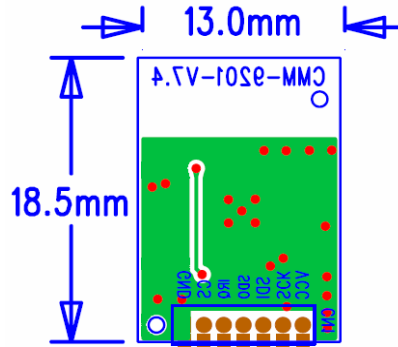
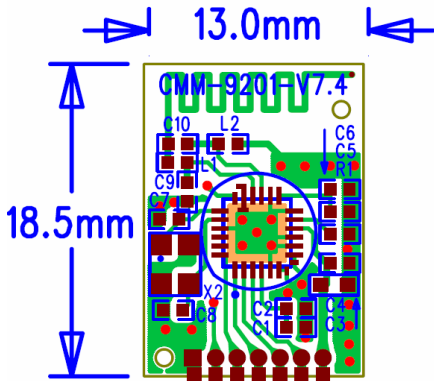
### 1.1 Features

- Fully integrated 2.4 GHz transceiver (Chip on Board)
- Operating voltage 1.9V ~ 3.6V
- Mini-sized (18.5mm x 13mm)
- Integrated Battery Low Detection
- Programmable RF output level (-18 to +3 dBm) via software control
- Low current consumption  
(0.8uA at standby, 14.0mA (@2.5V) in RX, 14.0 mA (@2.5V) in TX (0dBm))
- 1Mb/s (CMM-9201), 2Mb/s (CMM-9203) data rate
- No Tuning necessary
- Reaches 60m at open space line of sight
- GFSK modulation
- SPI interface to host controller
- Very easy to assembly, all components in one side

### 1.2 Module Dimension & Pin Assignment

Pin Number	Pin Name	Pin Description
1	GND	Ground Connection
2	CS	Chip Select (Active LO)
3	IRQ	Interrupt Output for external host Controller
4	SDO	SPI Data Output
5	SDI	SPI Data Input
6	SCK	SPI Clock Input
7	VCC	Power Supply

# CMM-9201/9203-V7.4 Mini 2.4GHz Transceiver Module



Thru-hole  $\phi = 0.65\text{mm}$



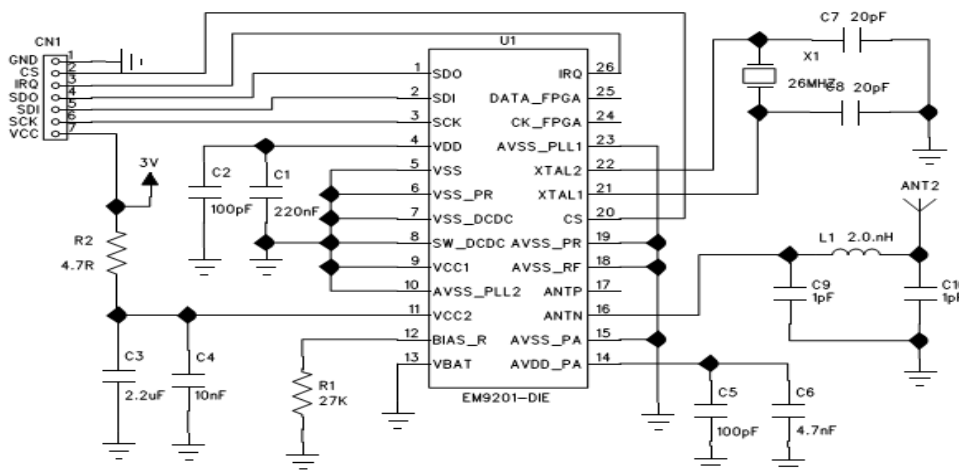
FRONT



BACK

Module thickness: 2.2mm max (SMT crystal)

## 1.3 Module Reference Circuit diagram



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# CMM-9201/9203-V7.4

## Mini 2.4GHz Transceiver Module

# C-MAX

### 1.4 Module Electrical Specifications

Specification	CMM-9201	CMM-9203
Voltage Range	1.9V to 3.6V	1.9V to 3.6V
Battery-low detection (adjustable)	2.1V to 2.45V	2.1V to 2.45V
Frequency Range	2.4 to 2.484 GHz	2.4 to 2.484 GHz
Modulation	GFSK	GFSK
On-air data rate	1Mbps	2Mbps
RF channels	40	40
Current Consumption (Vcc = 2.5V)		
- RX mode	14.0mA	14.0mA
- TX mode (0dBm output power)	14.0mA	14.0mA
- Standby Low Power mode	93 uA (typ.)	93 uA (typ.)
- Power-down mode	0.85uA	0.85uA
Programmable output power	-18dBm to +3dBm	-18dBm to +3dBm
RF setup time (Standby <-> TX/RX)	150 us (typ.)	150 us (typ.)

### 2. Ordering information

C-MAX Module Part Number	Max Data Rate	Typical Operating Voltage
CMM-9201-V7.4	1 Mbps	1.9 ~ 3.6V
CMM-9203-V7.4	2 Mbps	1.9 ~ 3.6V

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