
1. INTRODUCTION

1.1 Scope

The **WM201-RTL8188CE** is the WLAN + BT Combo solution for the Notebook / Netbook / UMPC/ MID to enable Wireless and Bluetooth functionalities on your portable systems.

- The form factor is Half Mini Card standard 30mm*26.8mm.
- There are two RF antenna connectors for auto diversity to get the best wireless performance. It enhances the WLAN-BT coexistence. That's why the BT and WLAN can perform very well independently.
- The combo card is cost-effective solution. With only one slot on the system design, it enables both WLAN 802.11n 1x1 and Bluetooth features on one card.
- With the software stack upgrade, it can be compliant with latest Bluetooth 3.0+HS specification. The switchable AMP (Alternate MAC/PHY) algorithm from BT to WLAN will raise the data transmission rate a lot.

Please refer to the photo of sample shown as below.

Top View (w shielding)



Bottom View

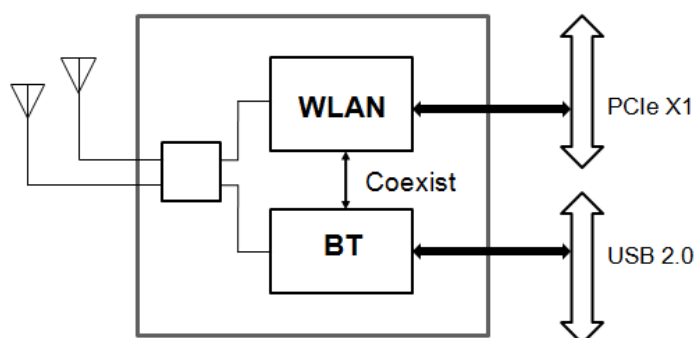


1.2 Features

- PCIe v.1.2 HMC (Half MiniCard H2 Type) specification.
- Bluetooth spec. v.2.1 plus EDR (Enhanced Data Rate) and 3.0+HS (High Speed) compliant.
- WLAN 802.11n , 1x1.
- I/O: PCIe for WLAN, and USB bus interface for BT.
- 2* RF connectors for external 2.4G antennas.
- WLAN-BT coexistence with separate radios.

- WLAN antenna diversity while BT coexists.
- Software upgradable to BT3.0+HS..
- RoHS compliant.

1.3 Block Diagram



1.4 Model Define

1.4.1 Hardware Configuration

The pin to enable / disable BT will be selectable by system designer. You can choose either PIN5 ,PIN51, PIN19, or PIN20. Please refer to the 2.1.4 PIN Define. Please select the proper model accordingly. The ordering models are shown as below.

Model define	Control PIN for BT on/off				PIN32 GND
	PIN5	PIN51	PIN19	PIN20	
RTL8188CE-N05	V				
RTL8188CE-N51		V			
RTL8188CE-N19			V		
RTL8188CE-N20				V	
RTL8188CE-G05	V				V
RTL8188CE-G51		V			V
RTL8188CE-G19			V		V
RTL8188CE-G20				V	V
RTL8188CE-G1951		V	V		V

1.4.2 Software Configuration

The BT3.0+Hs features can be upgraded from BT2.1 software stack , but no need of change of the hardware.

		RTL8188CEBT	RTL8188CEBT (M2)	RTL8188CEBT (M3)
WLAN 11n		V	V	V
BT2.1+EDR		V	V	V
Windows BT2.1 stack compatible (Vista SP2, Win7)		V	V	V
BT3.0+HS				V
Software bundled	Moto S/W BT2.1 Bundled		V	
	Moto S/W BT3.0 Bundled			V

NOTE:

1. WM201-RTL8188CE is the default model, it will **not bundle** any 3rd-party BT software stack. It can work well with Windows BT software stack which were available in Vista SP2 /Win7.
2. It requires Moto software stack to enable feature BT3.0 + HS.
3. Please refer to Section 2.2.2 for more details.
4. M2 stands for Moto stack 2.1 ; M3 stands for Moto stack 3.0.

2. SPECIFICATION

2.1 HARDWARE SPECIFICATION

2.1.1 General Specification

Bluetooth

Specification	BT3.0 / 2.1 and back compatible.
Radio Technology	FHSS (Frequency Hopping Spread Spectrum)
Basic Data Rate	1Mbps (GFSK)
Enhanced Data Rate	2Mbps (DQPSK); 3Mbps(8DPSK)
RF Frequency Range	2.4G~2.5GHz
Channel number	79 Channels , 1MHz bandwidth
Operating Voltage	+3.3V (+/-0.3V)
Interface	USB 2.0, full speed.

WLAN

Specification	IEEE 802.11 b/g/n Wireless Local Area Networks
Protocol	WEP 64/128, WPA, WPA2, TKIP, AES
PHY Rate	1T1R mode with 150Mbps PHY Rate for both transmit and receiving
RF Frequency Range	2.4G~2.5GHz
Operating Voltage	+3.3V (+/-0.3V)
Interface	PCI Express v.1.1

2.1.2 Board Specification

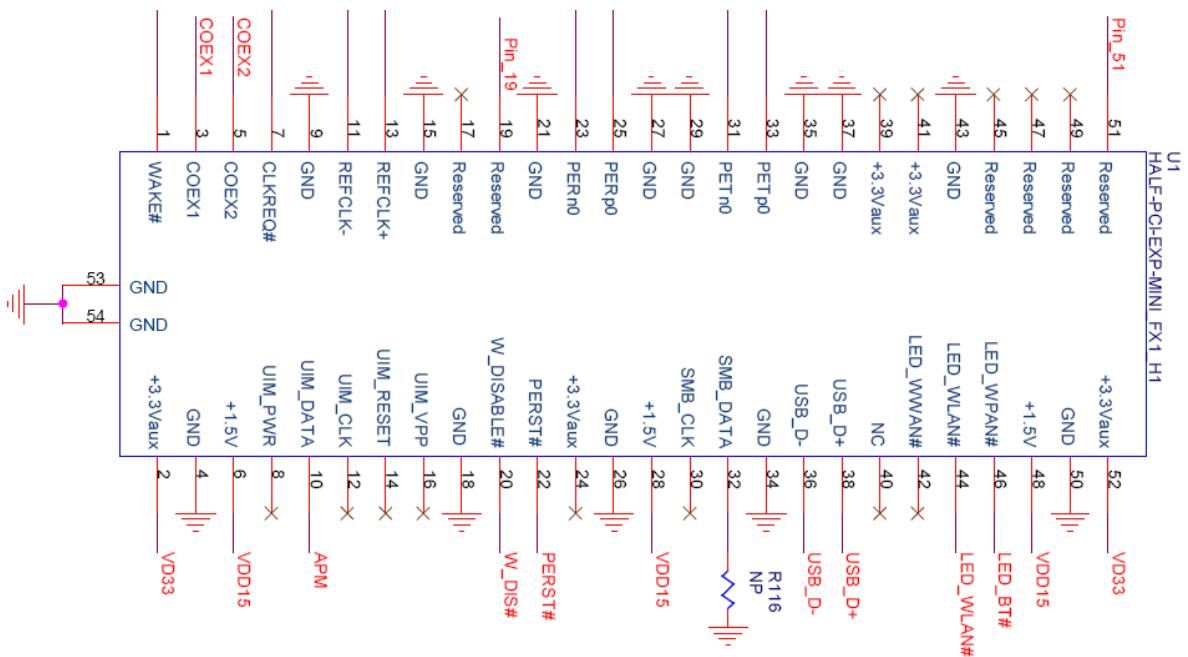
BT Chip	CSR BC0401PC08-IXB-R	
WLAN Chip	Realtek RTL8188CE	
Antenna	External antenna	
RF connector	iPEX or U.F.L , or equivalent	*2
Form Factor	Half Mini Card	

2.1.3 Environmental

Operating	Operating temperature: 0 to 85 degree C Relative Humidity : 5-90% (non-condensing)
Storage	Temperature: -20 to 85 degree C Relative Humidity : 5-95% (non-condensing)

2.1.4 PIN Define

Please refer to the following circuits to know the pin-definition.



PIN	Definition	Remark
1	WAKE#	
3	COEX1	
5	COEX2	0: to Disable BT (power off) ^[2] 1: to Enable BT
7	CLKREQ#	
9	GND	GND
11	REFCLK-	
13	REFCLK+	
15	GND	GND
17	RESERVED	NU
19	RFTXDIS#_2	0: to Disable BT (power off) ^[2] 1: to Enable BT
21	GND	GND
23	PERn0	
25	PETp0	
27	GND	GND
29	GND	GND
31	PETn0	
33	PETp0	
35	GND	GND
37	GND	GND
39	3.3VAUX	NU
41	3.3VAUX	NU
43	GND	GND
45	RESERVED	NU
47	RESERVED	NU
49	RESERVED	NU
51	RFTXDIS#_2	0: to Disable BT (power off) ^[2] 1: to Enable BT

PIN	Definition	Remark
2	+3.3V	+3.3V
4	GND	GND
6	+1.5V	+1.5VIN
8	UIM_PWR	NU
10	UIM_DATA	NU
12	UIM_CLK	NU
14	UIM_RESET	NU
16	UIM_VPP	NU
18	GND	GND
20	W_DISABLE##	0: WiFi Radio OFF 1: WiFi Radio ON
22	PERST#	0: to Disable WiFi (power off) ^[2] 1: to Enable WiFi
24	+3.3VAUX	NU
26	GND	GND
28	+1.5V	1.5VIN
30	SMB_CLK	NU
32	SMB_DATA	GND (or NU)
34	GND	GND
36	USB_D-	
38	USB_D+	
40	NC	NU
42	LED_WWAN#	NU
44	LED_WLAN#	LED for WiFi
46	LED_WPAN#	LED for BT
48	+1.5V	+1.5V
50	GND	GND
52	+3.3V	+3.3V

[1] NU: Not used.

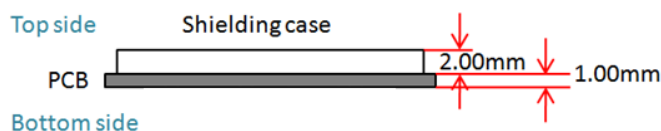
[2] "Power off" means the device is disabled, you cannot find it in Windows device manager.

Selectable PIN5 , PIN19, PIN51, PIN20 can be BT_Disable pin, **per customer requirement** in system design accordingly..

2.2 MECHANICAL SPECIFICATION

2.2.1 Board Dimension

Form factor	Half Mini Card		
PCB Dimension	30mm*26.8mm		
PCB thickness	1.0mm		
Max. height of components (from PCB)	Top side	Shielding case	2.00mm
	Bottom side	0mm	



2.2 SOFTWARE SPECIFICATION

2.2.1 Operating system

Windows XP, Vista, Win7.

2.2.2 BT Software Stack

The Bluetooth software stack could be Motorola or customer consigned. If the software is confirmed, the software key should be burned into the EEPROM on the module before shipment.

■ BT2.1 + EDR

Win XP

Windows did not provide BT stack in Win XP. It requires the 3-rd party software stack.

Vista / Win7

Windows Vista SP2 has basic BT stack support. It's enough for normal user experience such as BT mouse, keyboard, stereo headset, speaker; and the wireless connection with mobile phone, handheld devices.

- **BT3.0 + HS**

- XP/Vista/Win7**

Windows did not have compatible BT3.0 stack to allow APM (Alternate MAC/PHY) switch from BT to WLAN. So, it requires the 3-rd party software stack, such as latest Motorola BT3.0+HS version of software stack.

3. PACKING & ACCESSORIES

Contents	Unit	Remarks
RTL8188CE	*1	Follow customer Labeling spec.
Cable	*0	No cable is necessary.
Carton	TBD	100pcs per tray; 10 trays per Carton.

The package spec will be subject to updated until customer approval.