

Rainsun Corporation

Bluetooth® Module

Class2 BC04-ext Module

BTM-111

Features

- The module is a Max.4dBm(Class2) module.
- Bluetooth standard Ver. 2.0 + EDR conformity.
- Internal 1.8V regulator
- Low current consumption :
Hold,Sniff,Park,Deep sleep Mode
- 3.0v to 3.6v operation
- Support for up to seven slaves :
SCO links,ACL links,Piconet<7>
- Interface: USB,UART&PCM(for voice CODEC)
- SPP firmware is available
- Small outline. 25 x 14.5 x 2.2 mm

Applications

- GPS,PDA,USB, UART/RS232 Cable replacement

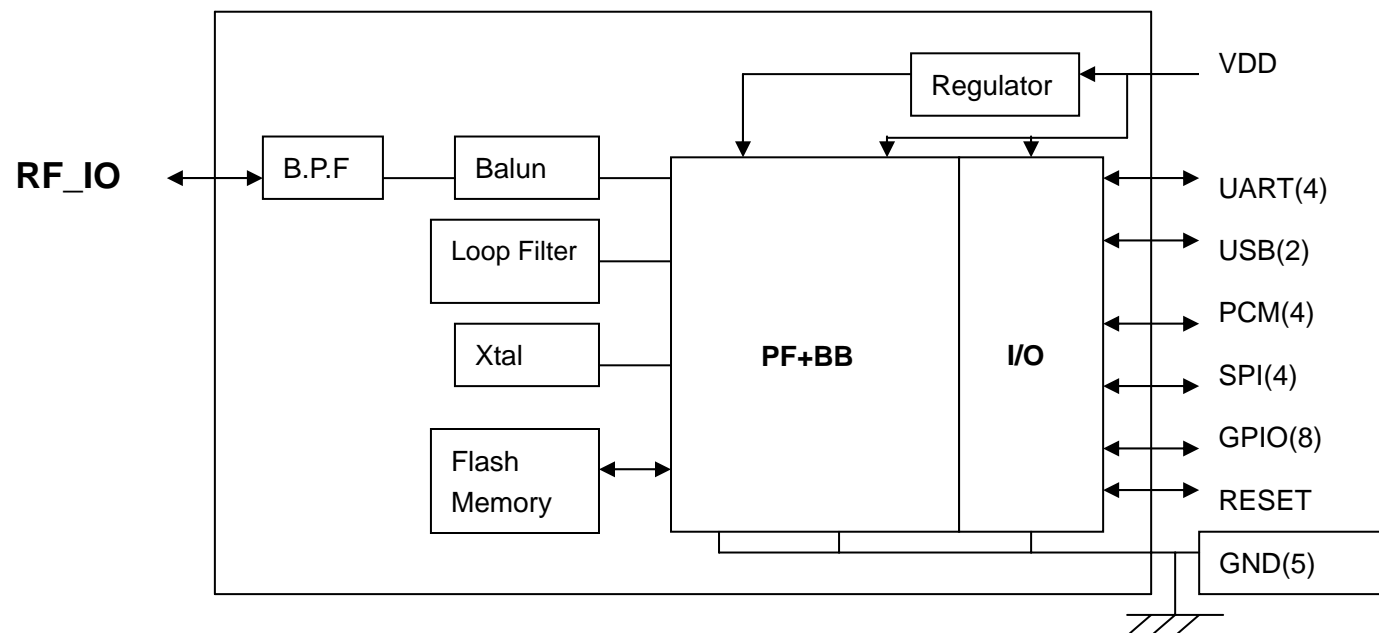
Outline



General Electrical Specification

Parameter	Description	Min.	Typ.	Max.	Units
Carrier Frequency		2.402		2.480	GHz
Operating Voltage (VDD)		3.00	3.30	3.60	V
RF Output Power	Measured in 50 ohm	-6	0	4	dBm
RX Sensitivity			-83	-70	dBm
Load Impedance	No abnormal Oscillation			5:1	-
Input Low Voltage	RESET,UART,GPIO,PCM	-0.30	-	0.80	V
Input High Voltage	RESET,UART,GPIO,PCM	0.70VDD	-	VDD+0.30	V
Output Low Voltage	UART,GPIO,PCM	-	-	0.40	V
Output High Voltage	UART,GPIO,PCM	VDD-0.40	-	-	V
Average Current Consumption	SCO connection HV1		46	-	mA
Peak Current	Tx burst +4dBm		-	80	mA

Block Diagram



BTM-11x Specification

Radio Characteristics – Basic Data Rate

Radio Characteristics, VDD = 3.3V Temperature =+20°C						
	Frequency (GHz)	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER	2.402	-	-83	-82	≤ - 70	dBm
	2.441	-	-83	-82		dBm
	2.480	-	-83	-82		dBm
Maximum received signal at 0.1% BER	2.402	-	-6	0	≥ - 20	dBm
	2.441	-	-6	0		dBm
	2.480	-	-6	0		dBm
RF transmit power ⁽¹⁾	2.402	-	+2	-	-6 to +4 ⁽²⁾	dBm
	2.441	-	+2	-		dBm
	2.480	-	+2	-		dBm
Initial carrier frequency tolerance	2.402	-	12	20	±75	kHz
	2.441	-	10	20		kHz
	2.480	-	9	20		kHz
20dBm bandwidth for modulated carrier	2.402	-	879	1000	≤ 1000	kHz
	2.441	-	816	1000		kHz
	2.480	-	819	1000		kHz
Drift (single slot packet)	2.402	-	-	20	≤25	kHz
	2.441	-	-	20		kHz
	2.480	-	-	20		kHz
Drift (five slot packet)	2.402	-	-	20	≤40	kHz
	2.441	-	-	20		kHz
	2.480	-	-	20		kHz
Drift Rate	2.402	-	-	15	20	kHz/50µs
	2.441	-	-	15		kHz/50µs
	2.480	-	-	15		kHz/50µs
RF power control range		16	35	-	≥16	dB
RF power range control resolution		-	1.8	-	-	dB
$\Delta f1^{avg}$ "Maximum Modulation"	2.402	145	165	175	140< $\Delta f1^{avg}$ <175	kHz
	2.441	145	165	175		kHz
	2.480	145	165	175		kHz
$\Delta f2^{maz}$ "Minimum Modulation"	2.402	115	150	-	115	kHz
	2.441	115	150	-		kHz
	2.480	115	150	-		kHz
C/I co-channel		-	10	11	≤ 11	dB
Adjacent channel selectivity C/I F=F ₀ +1 MHz ⁽³⁾⁽⁵⁾		-	-4	0	≤ 0	dB
Adjacent channel selectivity C/I F=F ₀ - 1MHz ⁽³⁾⁽⁵⁾		-	-4	0	≤ 0	dB
Adjacent channel selectivity C/I F=F ₀ +2 MHz ⁽³⁾⁽⁵⁾		-	-35	-30	≤ - 30	dB
Adjacent channel selectivity C/I F=F ₀ - 2MHz ⁽³⁾⁽⁵⁾		-	-21	-20	≤ - 20	dB
Adjacent channel selectivity C/I F>=F ₀ +3 MHz ⁽³⁾⁽⁵⁾		-	-45	-	≤ - 40	dB
Adjacent channel selectivity C/I F<=F ₀ -5 MHz ⁽³⁾⁽⁵⁾		-	-45	-	≤ - 40	dB
Adjacent channel selectivity C/I F=F _{image} ⁽³⁾⁽⁵⁾		-	-18	-9	≤ - 9	dB
Adjacent channel transmit power F=F ₀ ±2MHz ⁽⁴⁾⁽⁵⁾		-	-35	-20	≤ - 20	dBc
Adjacent channel transmit power F=F ₀ ±3MHz ⁽⁴⁾⁽⁵⁾		-	-55	-40	≤ - 40	dBc

Notes:

- (1) BlueCore-External firmware maintains the transmit power to be within the Bluetooth specification v2.0 limits.
- (2) Class 2 RF transmit power range, Bluetooth specification v2.0
- (3) Up to five exceptions are allowed in v2.0 of the Bluetooth specification

(4) Up to three exceptions are allowed in v2.0 of the Bluetooth specification

(5) Measured at $F_0 = 2441\text{MHz}$

Radio Characteristics – Enhanced Data Rate

Transmitter , VDD = 3.3V Temperature =+20°C						
	Frequency (GHz)	Min.	Typ.	Max.	Bluetooth Specification	Unit
Maximum RF transmit power	2.402	-6	0	+2	-6 to +20	dBm
	2.441	-6	0	+2		dBm
	2.480	-6	0	+2		dBm
Relative transmit power		-	-1.5	-	-4 to +1	dB
$\pi/4$ DQPSK Maximum carrier frequency stability w_0		-	2	-	$\leq \pm 10$ for all blocks	kHz
$\pi/4$ DQPSK Maximum carrier frequency stability w_i		-	6	-	$\leq \pm 75$ for all packets	kHz
$\pi/4$ DQPSK Maximum carrier frequency stability $ w_0 + w_i $		-	8	-	$\leq \pm 75$ for all blocks	kHz
8 DPSK Maximum carrier frequency stability w_0		-	2	-	$\leq \pm 10$ for all blocks	kHz
8 DPSK Maximum carrier frequency stability w_i		-	6	-	$\leq \pm 75$ for all packets	kHz
8 DPSK Maximum carrier frequency stability $ w_0 + w_i $		-	8	-	$\leq \pm 75$ for all blocks	kHz
$\pi/4$ DQPSK Modulation Accuracy	RMS DVEM	-	7	-	≤ 20	%
	99% DEVM	-	13	-	≤ 30	%
	Peak DEVM	-	19	-	≤ 35	%
8 DPSK Modulation Accuracy	RMS DVEM	-	7	-	≤ 13	%
	99% DEVM	-	13	-	≤ 20	%
	Peak DEVM	-	17	-	≤ 25	%
In-band spurious emissions	$F > F_0 + 3\text{ MHz}$	-	<-50	-	≤ -40	dBm
	$F < F_0 - 3\text{ MHz}$	-	<-50	-	≤ -40	dBm
	$F = F_0 - 3\text{ MHz}$	-	-46	-	≤ -40	dBm
	$F = F_0 - 2\text{ MHz}$	-	-34	-	≤ -20	dBm
	$F = F_0 - 1\text{ MHz}$	-	-35	-	≤ -26	dBm
	$F = F_0 + 1\text{ MHz}$	-	-35	-	≤ -26	dBm
	$F = F_0 + 2\text{ MHz}$	-	-31	-	≤ -20	dBm
$F = F_0 + 3\text{ MHz}$	-	-33	-	≤ -40	dBm	
EDR Differential Phase Encoding			No Errors		≥ 99	%
Receiver , VDD = 3.3V Temperature =+20°C						
	Modulation	Min.	Typ.	Max.	Bluetooth Specification	Unit
Sensitivity at 0.1% BER	$\pi/4$ DQPSK	-	-82	-	≤ -70	dBm
	8 DPSK	-	-76	-	≤ -70	dBm
Maximum received signal level at 0.1% BER	$\pi/4$ DQPSK	-	-8	-	≥ -20	dBm
	8 DPSK	-	-10	-	≥ -20	dBm
C/I co-channel at 0.1% BER	$\pi/4$ DQPSK	-	10	-	$\leq +13$	dB
	8 DPSK	-	19	-	$\leq +21$	dB
Adjacent channel selectivity C/I $F = F_0 + 1\text{ MHz}$	$\pi/4$ DQPSK	-	-10	-	≤ 0	dB
	8 DPSK	-	-5	-	$\leq +5$	dB
Adjacent channel selectivity C/I $F = F_0 - 1\text{ MHz}$	$\pi/4$ DQPSK	-	-11	-	≤ 0	dB
	8 DPSK	-	-5	-	$\leq +5$	dB

Adjacent channel selectivity C/I F=F ₀ +2 MHz	$\pi/4$ DQPSK	-	-40	-	≤ -30	dB
	8 DPSK	-	-40	-	≤ -25	dB
Adjacent channel selectivity C/I F=F ₀ -2 MHz	$\pi/4$ DQPSK	-	-23	-	≤ -20	dB
	8 DPSK	-	-20	-	≤ -13	dB
Adjacent channel selectivity C/I F=F ₀ +3 MHz	$\pi/4$ DQPSK	-	-45	-	≤ -40	dB
	8 DPSK	-	-45	-	≤ -33	dB
Adjacent channel selectivity C/I F=F ₀ -5 MHz	$\pi/4$ DQPSK	-	-45	-	≤ -40	dB
	8 DPSK	-	-45	-	≤ -33	dB
F ₀ = 2405, 2441, 2477 MHz						
Adjacent channel selectivity C/I F=F _{image}	$\pi/4$ DQPSK		-20		≤ -7	dB
	8 DPSK		-15		≤ 0	dB

BTM-115 Pin Functions

PIN	NAME	TYPE	FUNCTION	REMARK
1	PIO(8)	Bi-directional	Programmable Input/Output line	
2	PIO(9)	Bi-directional	Programmable Input/Output line	
3	PIO(10)	Bi-directional	Programmable Input/Output line	
4	AIO0	Bi-directional	Programmable Input/Output Line	
5	AIO1	Bi-directional	Programmable Input/Output Line	
6	RESET	CMOS input	Reset if high. Input debounced so must be high for >5ms to cause a reset	
7	SPI_MISO	CMOS Output	Serial Peripheral Interface Data Output	
8	SPI_CSB	CMOS Input	Chip Select For Synchronous Serial Interface active low	
9	SPI_CLK	CMOS Input	Serial Peripheral Interface Clock	
10	SPI_MOSI	CMOS Input	Serial Peripheral Interface Data Input	
11	UART_CTS	CMOS Input	UART Clear To Send (Active Low)	
12	UART_TX	CMOS Output	UART Data Output	
13	UART_RTS	CMOS Output	UART Request To Send (Active Low)	
14	UART_RX	CMOS Input	UART Data Input	
15	PIO(11)	Bi-directional	Programmable Input/Output line	
16	3V3	Power	3.3V Power Supply Input	
17	GND	GND	Ground	
18	PCM_OUT	CMOS Output	Synchronous Data Output	
19	PCM_SYNC	Bi-directional	Synchronous Data Sync	
20	PCM_IN	CMOS Input	Synchronous Data Input	
21	PCM_CLK	Bi-directional	Synchronous Data Clock	
22	USB_DP	Bi-directional	USB Data Plus	
23	USB_DN	Bi-directional	USB Data Minus	
24	PIO(7)	Bi-directional	Programmable Input/Output line. (Drive Link status led, active low)	
25	PIO(6)	Bi-directional	Programmable Input/Output line (Drive Link status led, active low)	
26	PIO(5)	Bi-directional	Programmable Input/Output line	
27	PIO(4)	Bi-directional	Programmable Input / Output Line	
28	PIO(3)	Bi-directional	Programmable Input/Output Line	
29	PIO(2)	Bi-directional	Programmable Input / Output Line	
30	PIO(1)	Bi-directional	Programmable Input/Output Line	
31	PIO(0)	Bi-directional	Programmable Input / Output Line (Wake up Input, active high)	
32	GND	GND	Ground	
33	RF_IO	Analogue	50 ohm Antenna connection	
34	GND	GND	Ground	

BTM-11x Pin out Information

PIN DETAILS VIEWED FROM TOP SIDE

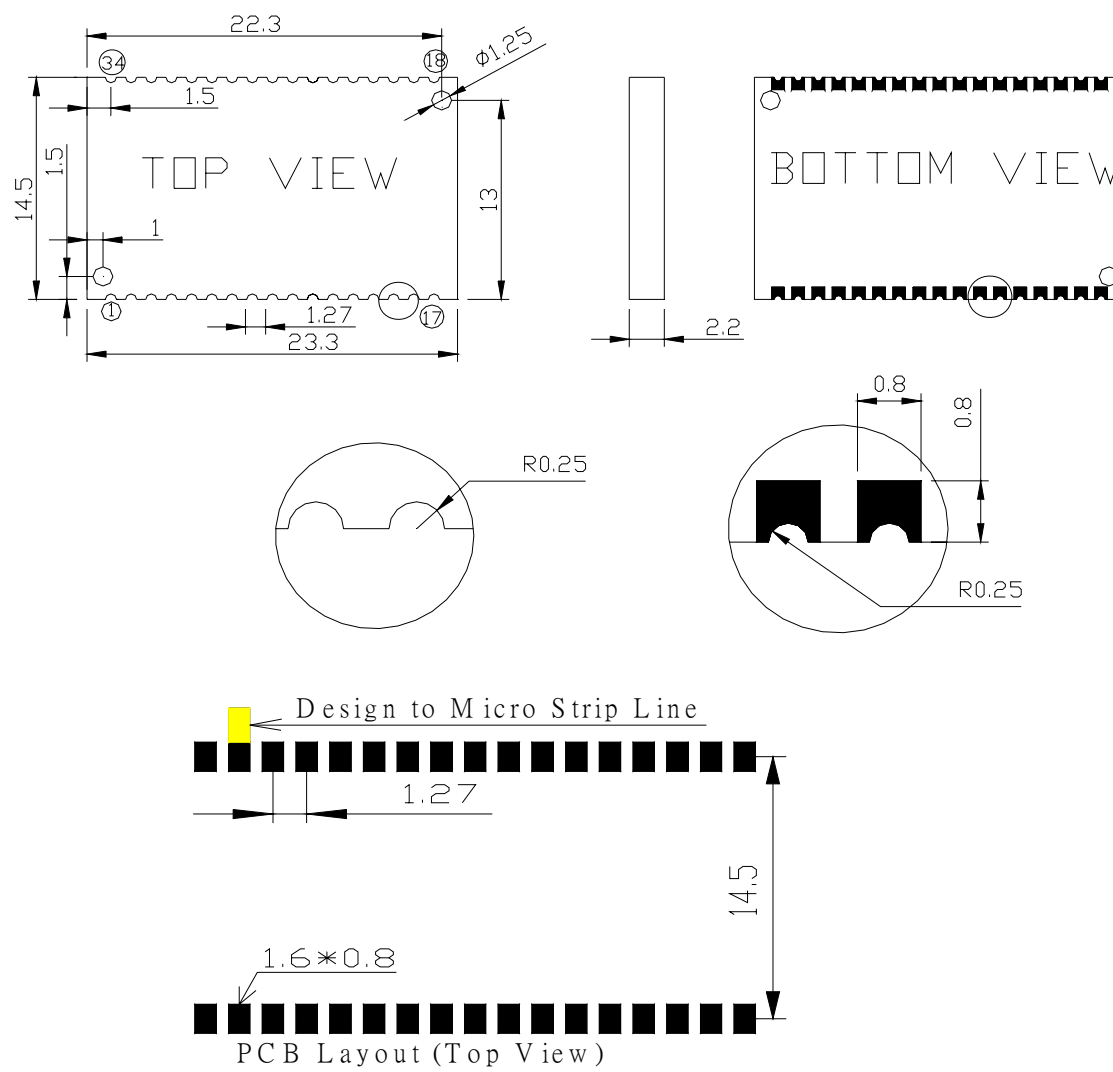
1	34
PIO(8)	GND
PIO(9)	RF_IO
PIO(10)	GND
AIO(0)	PIO(0)
AIO(1)	PIO(1)
RESET	PIO(2)
SPI_MISO	PIO(3)
SPI_CSB	PIO(4)
SPI_CLK	PIO(5)
SPI_MOSI	PIO(6)
UART_CTS	PIO(7)
UART_TX	USB_DN
UART_RTS	USB_DP
UART_RX	PCM_CLK
PIO(11)	PCM_IN
3V3	PCM_SYNC
GND	PCM_OUT
17	18

MODULE PAD AND SOLDER MASK DETAILS

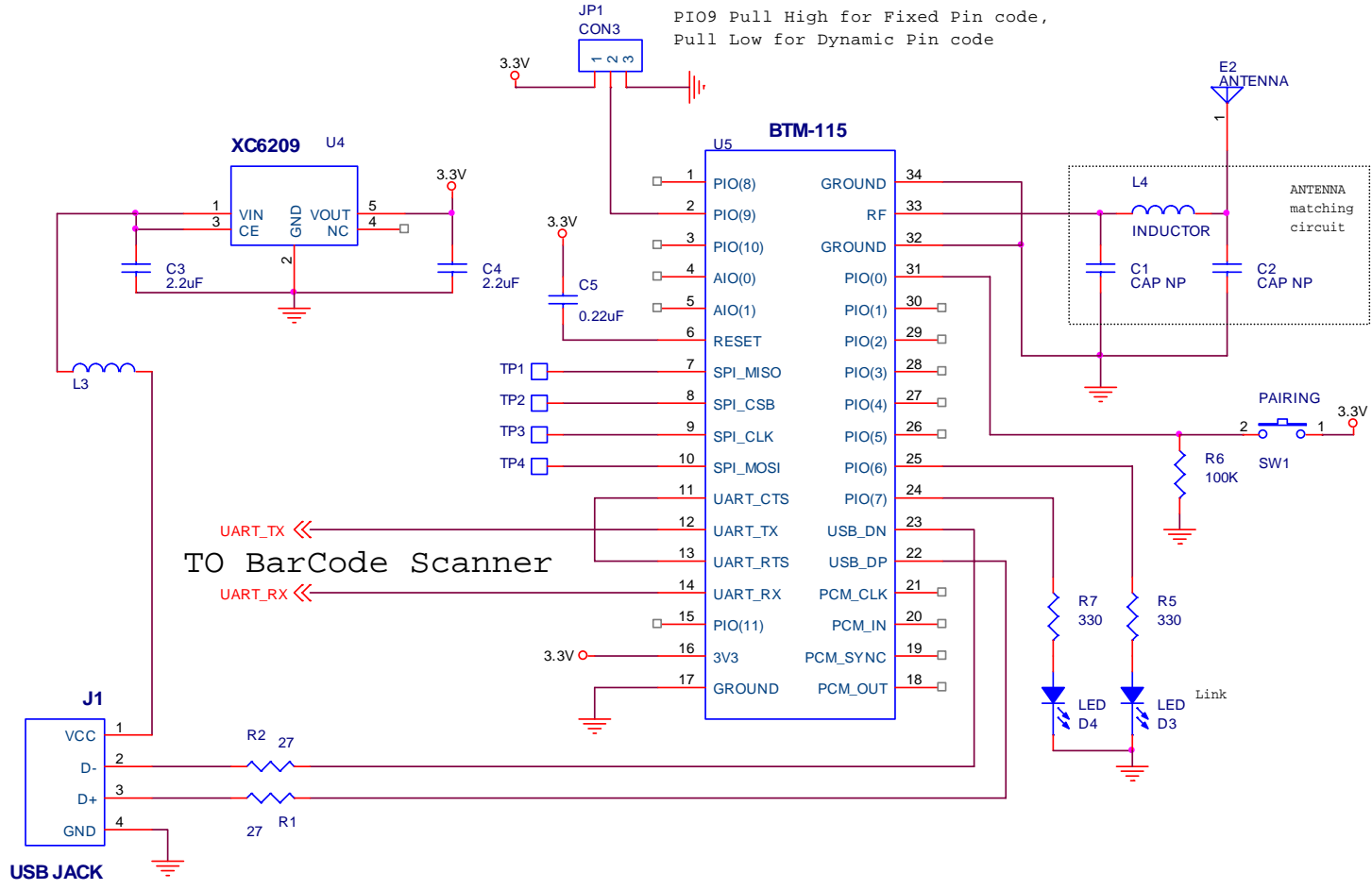
SOLDER MASK WINDOW 1.0mm MAX

SOLDER PAD 0.8mm

MECHANICAL DETAILS VIEWED FROM TOP/BOTTOM SIDE



For BarCode Scanner HID Application Schematic



Title		
Class2 MODULE FOR BarCode HID APPLICATION		
Size	Document Number	Rev
A	<Doc>	XX
Date:	Thursday, July 05, 2007	Sheet 1 of 1