

# Rainsun Bluetooth® Module

## BC03-audio Class2 Mono Module

## BTM-350

### Features

- The module is a Max.4dBm( Class2 ) module.
- Bluetooth standard Ver. 2.0 conformity.
- Low current consumption :  
**Park, Sniff, Hold and Deep Sleep**
- RF Core 1.8V operation
- Built-in 15-bit Linear Audio Codec
- Embedded 6Mbit Flash Memory
- Integrated Switch-mode Regulator
- Integrated Battery Charger with programmable current
- Interface: USB,UART&PCM(for voice CODEC)
- HCI or Headset,Gateway,SPP firmware is available
- RoHS compliant
- Small outline. 16.5 x 13 x 2.2 mm

### Applications

- Notebook PC,PDA
- Cellular Phone
- Cordless headset
- Headsets
- Automotive hands-free kits
- General purpose Bluetooth system requiring an On-chip CODEC

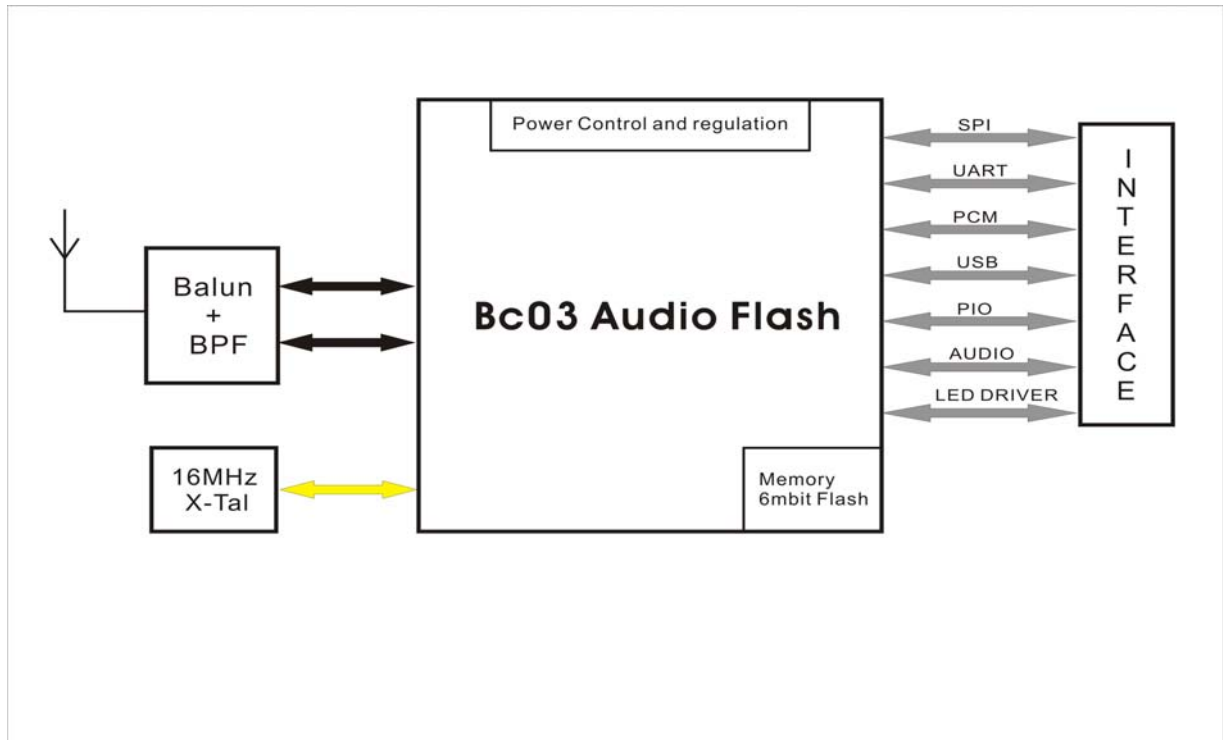
### Outline



## Electrical Characteristics

Absolute Maximum Ratings			
Ratings	Min.	Max.	
Storage Temperature	-40 °C	+150 °C	
Supply Voltage VDD	-0.4 V	3.7 V	
Recommended Operating Condition			
Operating Condition	Min.	Max.	
Operating Temperature range	-20 °C	+85 °C	
Supply Voltage VDD	3.0 V	3.6 V	
Power Consumption: VDD=1.8V    Temperature=+20°C    Output power=+4dBm			
Mode	Average	Unit	
SCO connection HV3 (no sniff mode) (slave)	24.2	mA	
SCO connection HV1 (master) (slave)	37.6	mA	
ACL data transfer 921kpbs UART (slave)	30.9	mA	
Standby mode (connected to host, no RF activity)	0.10	mA	
Parked slave, 1.28s beacon interval, 38.4kpbs UART	0.28	mA	
Reset(RESETB low)	57	uA	
CODEC	Microphone input and ADC	0.85	mA
	DAC and loudspeaker driver, no signal	1.4	mA

## Block Diagram



## Audio CODEC Performance

Audio CODEC 15Bit Resolution		Min	Type	Max	Unit
Microphone amplifier	Input full scale at maximum gain	-	3	-	mV rms
	Input full scale at minimum gain	-	350	-	mV rms
	Gain resolution <sup>(1)</sup>	2.8	3.0	3.2	dB
	Distortion at 1KHz	-	-	-78	dB
	Input referenced rms noise <sup>(2)</sup>	-	5	-	uV rms
	Bandwidth	-	20	-	KHz
	Mic mode input impedance	-	20	-	K $\Omega$
	Input mode input impedance	-	130	-	$\Omega$
Loudspeaker Driver	Output voltage full scale swing(differential)	-	2.0	-	V Pk-Pk
	Output current drive(at full scale swing) <sup>(3)</sup>	10	20	40	mA
	Output full scale current(at reduced swing) <sup>(4)</sup>	-	75	-	mA
	Output -3dB bandwidth	-	18.5	-	KHz
	Distortion and noise(relative to full scale)(32 $\Omega$ load) differential	-	-75	-	dB
	Allowed load: resistive	8	-	OC	$\Omega$
	Allowed load: capacitive	-	-	500	pF

**Note:** (1) 42dB range of gain control(under software control).

(2) Noise bandwidth from 100Hz to 4KHz gain setting > 17dB.

(3) Output for 0.1THD, signal level of 2V Pk-Pk differential.

(4) Output for 1THD, signal level of 1V Pk-Pk differential.

(5)Output swing reduced to 1.2V Pk-Pk differential with 1THD or 0.1V Pk-Pk differential with 0.1THD

## Radio Characteristics: VDD=1.8V Temperature=+20°C

Transmitter Performance						
Parameter	Min.	Type	Max	Bluetooth Spec.	Unit	
RF transmit power	-	2	-	-6 to +4	dBm	
RF power control range	-	35	-	$\geq 16$		
RF power range control resolution	-	0.5	-			
20dB bandwidth for modulated carrier	-	820	-	$\leq 1000$	KHz	
Initial carrier frequency tolerance	-	3.0	-	$\pm 75$	KHz	
Carrier frequency drift	Drift Rate	-	8.0	-	$\pm 20$	KHz/50uS
	DH1	-	8.0	-	$\pm 24$	KHz
	DH3	-	9.0	-	$\pm 40$	KHz
	DH5	-	10	-	$\pm 40$	KHz
Adjacent characteristic	+/- 2 MHz	-	-45	-	$\leq -20$	dBm
	+/- 3 MHz	-	-48	-	$\leq -40$	dBm
	+/- 4MHz	-	<-50	-	$\leq -40$	dBm
Modulation characteristic	$\Delta F_{1avg}$	-	165	-	$140 \leq \Delta F_{1avg} \leq 175$	KHz
	$\Delta F_{2avg}$	-	151	-	115	KHz
	$\Delta F_{1avg}/\Delta F_{1avg}$	-	0.99	-	$\geq 0.8$	
Receiver Performance						
Parameter	Frequency (GHz)	Min.	Type	Max	Bluetooth Spec.	Unit
Sensitivity at 0.1% BER for all packet types	2402	-	-82	-	$\leq -70$	dBm
	2441	-	-83	-		dBm
	2480	-	-82	-		dBm
Maximum receive signal at 0.1% BER		-20	>-10	-	$\geq -20$	dBm
C/I performance Adjacent channel sensitivity	C/I co-channel	-	10	-	$\leq 11$	dB
	F=F <sub>0</sub> +1MHz	-	-2	-	$\leq 0$	dB
	F=F <sub>0</sub> -1MHz	-	0	-	$\leq 0$	dB
	F=F <sub>0</sub> +2MHz	-	-38	-	$\leq -30$	dB
	F=F <sub>0</sub> -2MHz	-	-22	-	$\leq -20$	dB
	F=F <sub>0</sub> +3MHz	-	-50	-	$\leq -40$	dB
	F=F <sub>0</sub> -5MHz	-	-50	-	$\leq -40$	dB
	F=F <sub>image</sub>	-	-27	-	$\leq -9$	dB
Max. level of intermodulation interferers		-	-27	-	$\geq -39$	dBm
Spurious output level		-	<-150	-		dBm/Hz

## BTM-350 Pins Function

No.	Pin Name	Pin Type	Pin description
1	GND	GND	Common ground
2	RF_IO	Analogue	Antenna interface
3	GND	GND	Common ground
4	PIO[0]	Bi-directional	Programmable I/O terminal, RX Enable
5	PIO[1]	Bi-directional	Programmable I/O terminal, TX Enable
6	PIO[2]	Bi-directional	Programmable I/O terminal, external CLK_REQ
7	PIO[3]	Bi-directional	Programmable I/O terminal
8	SPK_N	Analogue	Speaker output negative
9	SPK_P	Analogue	Speaker output positive
11	MIC_N	Analogue	Microphone input negative
10	MIC_P	Analogue	Microphone input positive
12	GND	GND	Common ground
13	1.8V	Power	1.8V Internal Power Output
14	VDD	Power	Connect to 1.8V or 3.3V
15	AIO[0]	Bi-directional	Programmable Input/Output Line, Battery Monitor Input
16	AIO[1]	Bi-directional	Programmable Input/Output Line
17	UART_RTS	CMOS output	UART request to send(active low)
18	UART_TX	CMOS output	UART data output
19	UART_RX	CMOS input	UART data input
20	UART_CTS	CMOS input	UART clear to send(active low)
21	PIO[4]	Bi-directional	Programmable I/O terminal
22	USB_DN	Bi-directional	USB data minus
23	USB_DP	Bi-directional	USB data plus
24	PCM_IN	CMOS input	Synchronous data input
25	PCM_SYNC	Bi-directional	Synchronous data sync
26	PCM_CLK	Bi-directional	Synchronous data clock
27	PCM_OUT	CMOS output	Synchronous data output
28	PIO[5]	Bi-directional	Programmable I/O terminal
29	RESETB	CMOS input	Reset input (Active low)
30	SPI_CLK	CMOS input	Serial Peripheral Interface clock
31	SPI_MISO	CMOS output	Serial Peripheral Interface data output
32	V_CHG	Power	Lithium lion battery charger input
33	GND	GND	Common ground
34	VBAT	Power	Battery power input
35	SPI_MOSI	CMOS input	Serial Peripheral Interface data input
36	SPI_CSB	CMOS input	Chip select for Synchronous Serial Interface(active low)
37	LED[1]	Open drain output	Current sink to drive LED
38	LED[0]	Open drain output	Current sink to drive LED
39	VREG_EN	CMOS input	Internal Regulator enable control input
40	PIO[9]	Bi-directional	Programmable I/O terminal
41	PIO[10]	Bi-directional	Programmable I/O terminal
42	PIO[11]	Bi-directional	Programmable I/O terminal



