

Datasheet

BTR200

Key Features

- A small and cost effective Bluetooth® System
- Bluetooth® specification v1.2/v2.0 compliant
- Class 2, up to 10-meter range
- Complete 2.4GHz Bluetooth® System including:
 - Hardware: Radio, Baseband, and Flash
 - Standard Firmware: HCI or RFCOMM stack
- Power management: low power 1.8V operation for Bluetooth® core
- Compact size: 20 mm x 13 mm x 2.3 mm
- Bluetooth® Profile Supported: HSP, HFP, A2DP and AVRCP profiles
- Built-in stereo codec
- External antenna
- On-board flash memory (8Mbits)
- Allow dual boots
- Audio streaming
- Optional noise and echo cancellation software library
- Support multiple connections
- Surface mount module for embedded applications
- Several firmware options
- Rewritable flash memory for easy upgrade route
- Custom firmware production available



Description

The **Bluetron™ BTR200 module** from AvantWave is a complete Bluetooth® solution for fast implementation, cutting your time-to-market. It is a short-range, compact and cost effective radio/baseband module that can be implemented in any kind of electronic devices, such as hands-free car kit, stereo headset and telephone gateway, etc.

In standard configuration the module includes a baseband processor with on board 8Mbit Flash memory, a radio front-end, antenna interface, supporting circuitry, together with some higher-level software protocols and applications such as L2CAP, SDP, SPP, GAP, HSP, HFP, A2DP and AVRCP are resided in the Flash.

The **Bluetron™ BTR200 module** is a power class 2 Bluetooth® devices, and is in compliance with version 1.2/2.0 of the Bluetooth® specification. It is supplied with Bluetooth® protocol stack firmware which runs on the internal microprocessor. **Bluetron™ BTR200 module** is built on CSR BC03 Multimedia External core with an 8Mbit Flash memory for firmware and application software storage.

Applications

- Stereo Bluetooth® headset
- Automotive car kit applications
- PDAs and other portable terminals
- MP3 headset



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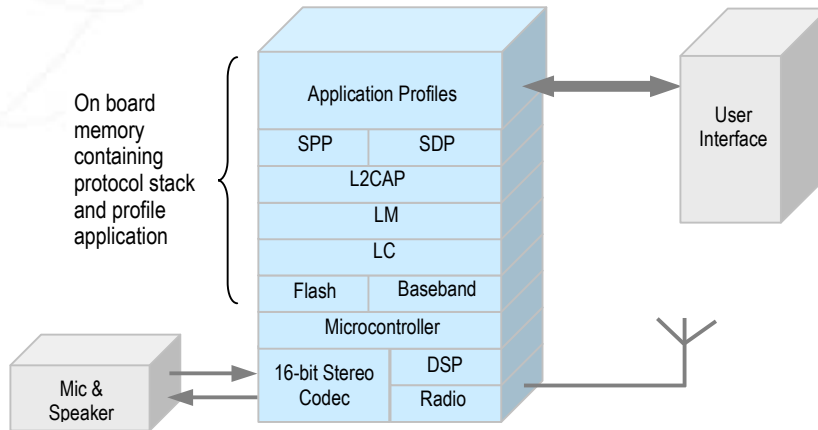
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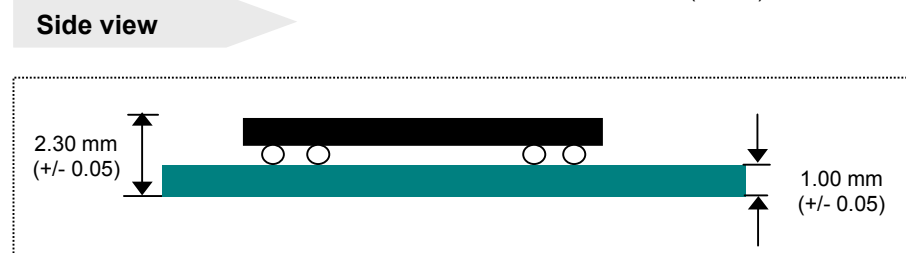
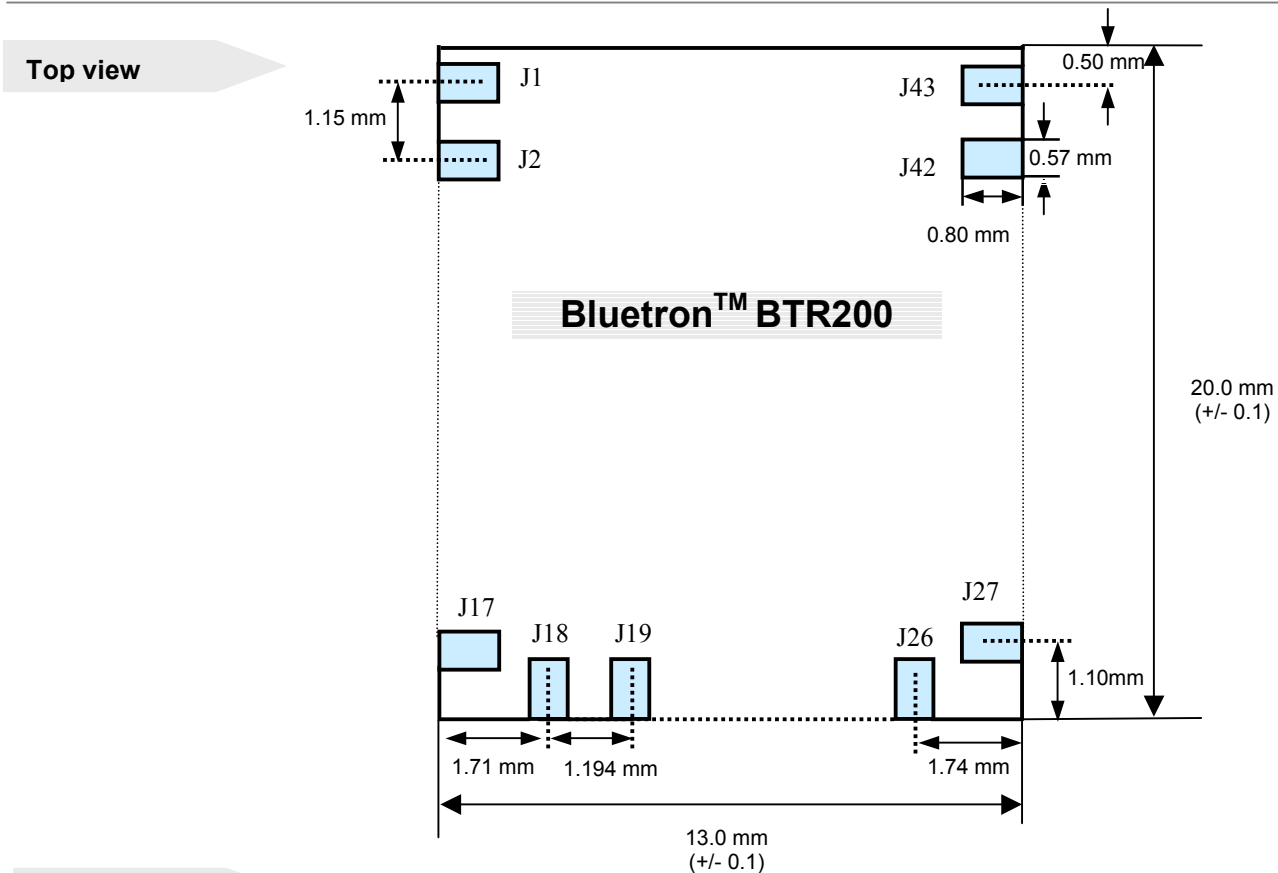
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Software

The upper layers of the Bluetooth stack (above HCI) runs on-package. No external microcontroller is required.



Mechanical Specification



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Pin Assignment

Terminal	Name	Description
1	GND	Ground Connection
2	ANT	50 Ohm antenna port
3	AIO[1]	Programmable input/output line
4	AIO[0]	Programmable input/output line
5	AUDIO_OUT_P_LEFT	Analog speaker output positive (left side)
6	AUDIO_IN_N_LEFT	Analog microphone input negative (left side)
7	AUDIO_IN_P_LEFT	Analog microphone input positive (left side)
8	AUDIO_IN_N_RIGHT	Analog microphone input negative (right side)
9	AUDIO_IN_P_RIGHT	Analog microphone input positive (right side)
10	AUDIO_OUT_N_LEFT	Analog speaker output negative (left side)
11	AIO[3]	Programmable input/output line
12	SPI_CLK	Serial Peripheral Interface clock
13	+1.8V	Positive supply for analog, core (can be generated by internal linear voltage regulator)
14	GND	Ground connection
15	+3.3V	Positive supply for external flash, PIO and internal linear voltage regulator
16	USB_D+	USB data plus
17	PCM_CLK	PCM synchronous data clock
18	UART_RX	UART data input
19	SPI_CSB	Chip select for synchronous serial peripheral interface
20	UART_RTS	UART request to send active low
21	PIO[6]	Programmable input/output line
22	PIO[5]	Programmable input/output line
23	UART_CTS	UART clear to send active low
24	UART_TX	UART data output
25	PCM_IN	PCM Synchronous data input
26	PCM_OUT	PCM Synchronous data output



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27	RESET	Reset if high for >5ms
28	PCM_SYNC	PCM Synchronous data sync
29	USB_D-	USB data minus
30	PIO[1]	Programmable input/output line
31	SPI_MISO	Serial Peripheral Interface data output
32	SPI_MOSI	Serial Peripheral Interface data input
33	PIO[7]	Programmable input/output line
34	AUDIO_OUT_P_RIGHT	Audio Speaker Output Positive (right side)
35	AUDIO_OUT_N_RIGHT	Audio Speaker Output Negative (right side)
36	PIO[4]	Programmable input/output line
37	PIO[3]	Programmable input/output line
38	PIO[2]	Programmable input/output line
39	PIO[10]	Programmable input/output line
40	PIO[11]	Programmable input/output line
41	PIO[9]	Programmable input/output line
42	PIO[8]	Programmable input/output line
43	PIO[0]	Programmable input/output line

General Specifications

	Minimum	Typical	Maximum	Unit
Supply Voltage, VDD	3.0	3.3	3.6	V
Regulated Output Voltage (load = 70 mA)	1.7	1.78	1.85	V
Operating Temperature range (Please read ordering information)	-20 or -40	-	70 or 85	°C
Storage Temperature range	-40	-	105	°C
Frequency Range	2.4	-	2.4835	GHz

I/O Terminal Characteristics	Minimum	Typical	Maximum	Unit
Input Voltage Levels				
Input Voltage logic level low	-0.4	-	0.8	V
Input Voltage logic level high	0.7*VDD	-	VDD+0.4	V
Output Voltage Levels				
Output Voltage logic level low	-	-	0.2	V
Output Voltage logic level high	VDD-0.2	-	-	V
Reset Levels				
Reset logic level low	-0.4	-	0.8	V
Reset logic level high	0.7*VDD	-	VDD+0.4	V



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RF Specifications

Voltage Supplies = 3.3V
Temperature = 25°C
Frequency = 2.441GHz

Receiver	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER	- 84	-82.5	- 81	-70	dBm
Maximum received signal	0	0.7	1.5	≥-20	dBm
C/I Co-channel		8	-	≤11	dB
C/I Adjacent channel (F=F ₀ +1MHz)	-	-4	-	≤0	dB
C/I Image rejection (F=F _{image})	-	-20	-	≤-9	dB
Transmitter	Min	Typ	Max	Bluetooth Specification	Unit
Average Output Power	-2.0	0.8	4	+4 to -6	dBm
20dB bandwidth	-	800	-	≤ 1000	kHz
2 nd Adjacent Channel Power (+/-2MHz)	-	-40	-	≤ -20	dBm
3 rd Adjacent Channel Power (+/-3MHz)	-	-45	-	≤ -40	dBm

Codec Characteristics

Microphone Amplifier	Minimum	Typical	Maximum	Unit
3dB Bandwidth	-	17	-	kHz
Input impedance	-	20	-	kΩ
Gain Resolution	-	3	-	dB
Distortion at 1kHz	-		-74	dB
Input full scale at maximum gain	-	4	-	mV rms
Input full scale at minimum gain	-	400	-	mV rms
Loudspeaker Driver				
Output power into 32Ω	-	30	-	mW pk
Output voltage full scale swing	-	2.0	-	V pk-pk
Output current drive (at full scale swing)	10	20	40	mA
Output full scale current (at reduced swing)	-	75	-	mA
Distortion and noise (relative to full scale), THD	-	-75	-	dBc
Allowed load: resistive	16	-	O.C.	Ω
Allowed load: capacitive	-	-	500	pF

Note: For specified THD. Much greater current can be supplied by the loudspeaker driver with compromised THD.



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Power Consumption

Voltage Supplies = 3.3V
 Temperature = 25°C
 Frequency = 2.441GHz

Mode	Average	Peak	Unit
SCO connection HV3 (30ms interval sniff mode)(slave)	21	-	mA
SCO connection HV3 (30ms interval sniff mode)(Master)	21	-	mA
SCO connection HV3 (no sniff mode)(slave)	28	-	mA
SCO connection HV1 (Slave)	42	-	mA
SCO Connection HV1 (Master)	42	-	mA
ACL data transfer 115.2kbps UART (Master)	5	-	mA
ACL data transfer 115.2kbps UART (slave)	22	-	mA
ACL data transfer 720kbps UART (Master or slave)	45	-	mA
ACL data transfer 720kbps USB (Master or slave)	45	-	mA
ACL connection, sniff mode 40ms interval, 38.4kbps UART	3.2	-	mA
ACL connection, sniff mode 1.28s interval, 38.4kbps UART	0.45	-	mA
Parked Slave, 1.28s beacon interval, 38.kbps UART	0.55	-	mA
Standby Mode (Connected to host, no RF activity)	47	-	µA
Reset (RESET high or RESETB low)	15	-	µA

Ordering Information

Code	Description
BTR200A-I	A - with internal 1.8V linear voltage regulator disabled I - operation temperature: -40 °C to 85 °C [Industrial Grade]
BTR200A-C	A - with internal 1.8V linear voltage regulator disabled C - operation temperature: -20 °C to 70 °C [Commercial Grade]
BTR200B-I	B - with internal 1.8V linear voltage regulator enabled I - operation temperature: -40 °C to 85 °C [Industrial Grade]
BTR200B-C	B - with internal 1.8V linear voltage regulator enabled C - operation temperature: -20 °C to 70 °C [Commercial Grade]



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Solder Profiles

The soldering profile depends on various parameters necessitating a set up for each application. The data here is given only for guidance on solder re-flow.

Zone	Sensor	Description
Preheat Zone	1-2	This zone raises the temperature at a controlled rate
Equilibrium Zone	3	This zone brings the board to a uniform temperature and also activates the flux. The duration in this zone will need to be adjusted to optimize the out gassing of the flux
Reflow Zone	4	The peak temperature should be high enough to achieve good wetting but not so high as to cause component discoloration or damage. Excessive soldering time can lead to intermetallic growth which can result in a brittle joint.
Cooling Zone	5-6	The cooling rate should be fast, to keep the solder grains small which will give longer lasting joint.

Solder Re-Flow Profile for Devices with Lead-Free Solder Paste

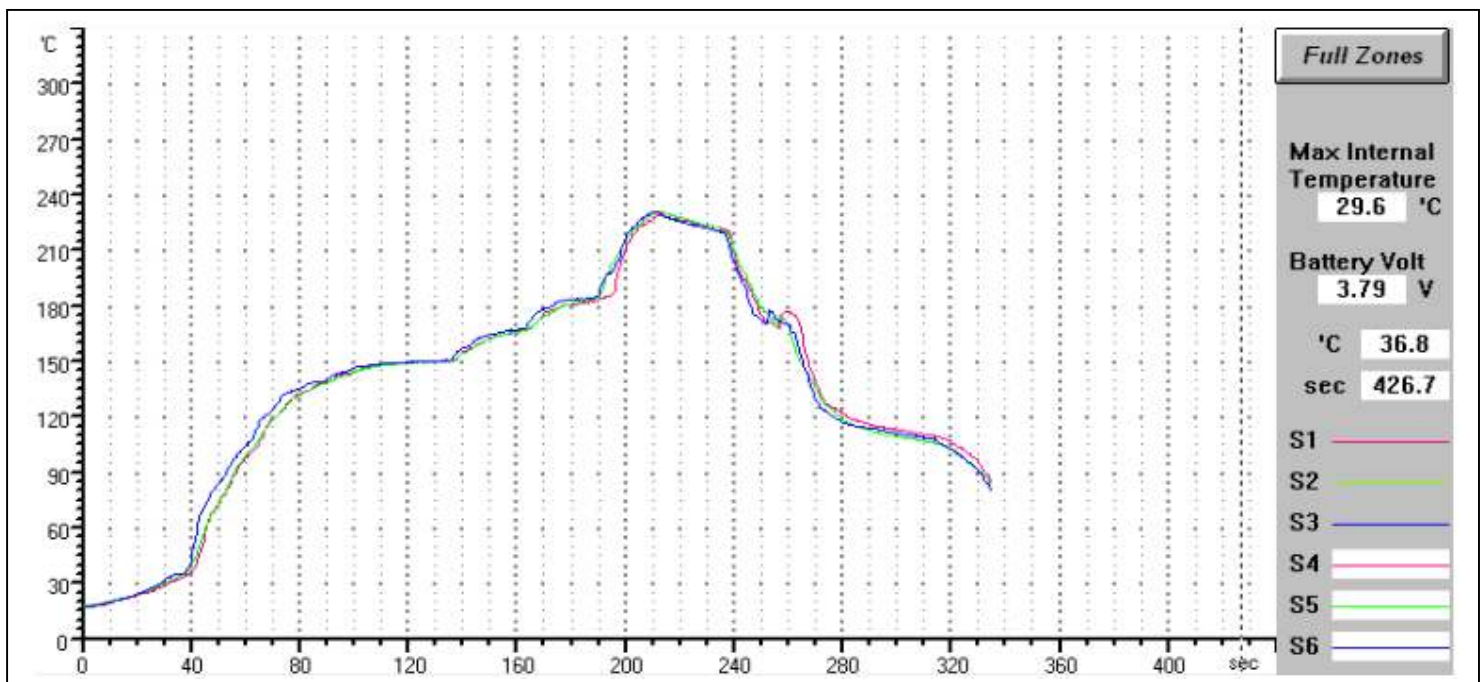


Figure 1.1: Typical Lead-Free Re-flow Solder Profile

Temperature Analysis at 200°C

Sensor	Max °C	Max at (s)	Over (s)
S4	229.5	212.5	44
S5	230.6	212.5	49
S6	231.1	211.5	45

Remarks

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