



Datasheet BTR170



Key Features

- A small and cost effective Bluetooth® System
- Bluetooth® specification v2.0 +EDR compliant
- Class 1, up to 100-meter range
- Complete 2.4GHz Bluetooth® System including:
 - Hardware: Radio, Baseband and Crystal & Memory
 - Standard Firmware: HCI or RFCOMM stack
- Power management: low power 1.8V operation for Bluetooth® core
- Compact size: 30.12 mm x 15.00 mm x 2.80 mm
- 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™ BTR170 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 access point, telephone gateway, serial port adaptor, 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, GAP and RFCOMM are resided in the Flash.

The **Bluetron™ BTR170 module** is a power class 1 Bluetooth® devices, and is in compliance with version 2.0 of the Bluetooth® specification. It is supplied with Bluetooth® protocol stack firmware which runs on the internal microprocessor. **Bluetron™ BTR170 module** is built on CSR BC04 External core with an 8Mbits Flash memory for firmware and application software storage.

Applications

- PDAs and other portable terminals
- Cable replacement between Bluetooth enabled devices
- Point-of-sales (POS) systems
- Telemetry and machine-to-machine devices
- Fitness and sports telemetry devices
- Industrial PCs and laptops
- Access Points
- Metering devices
- Home entertainment
- Digital cameras
- Dongles



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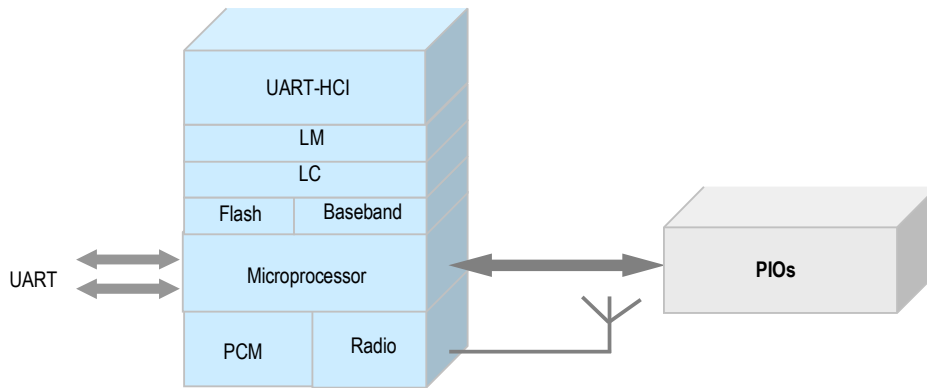
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Software

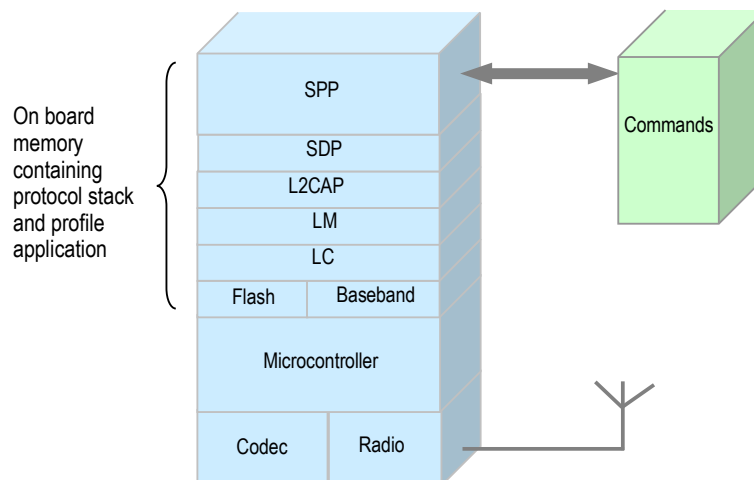
1) BTR170-H4

BTR170-H4 consists of Bluetooth UART-HCI protocol stack without Bluetooth upper stacks. It allows host communicates with the Bluetooth transceiver via standard UART link. To complete the Bluetooth application design, the host should be implemented with Bluetooth upper stacks and application programs. BTR170-H4 is an ideal component for a host running its own Bluetooth upper stacks. The available speeds for BTR170-H4 are 9.6k, 19.2k, 38.4k, 57.6k, 115.2k, 230.4k, 460.8k and 921.6kbps or higher data rate.



2) BTR170-SPP330

For cable replacement type of application, the SPP firmware is designed and targeted to be used in an embedded host system. SPP defines the requirements for Bluetooth devices necessary for setting up emulated serial cable connections using RFCOMM between two peer devices. SPP shall be used by devices using Bluetooth for RS232 serial cable emulation.



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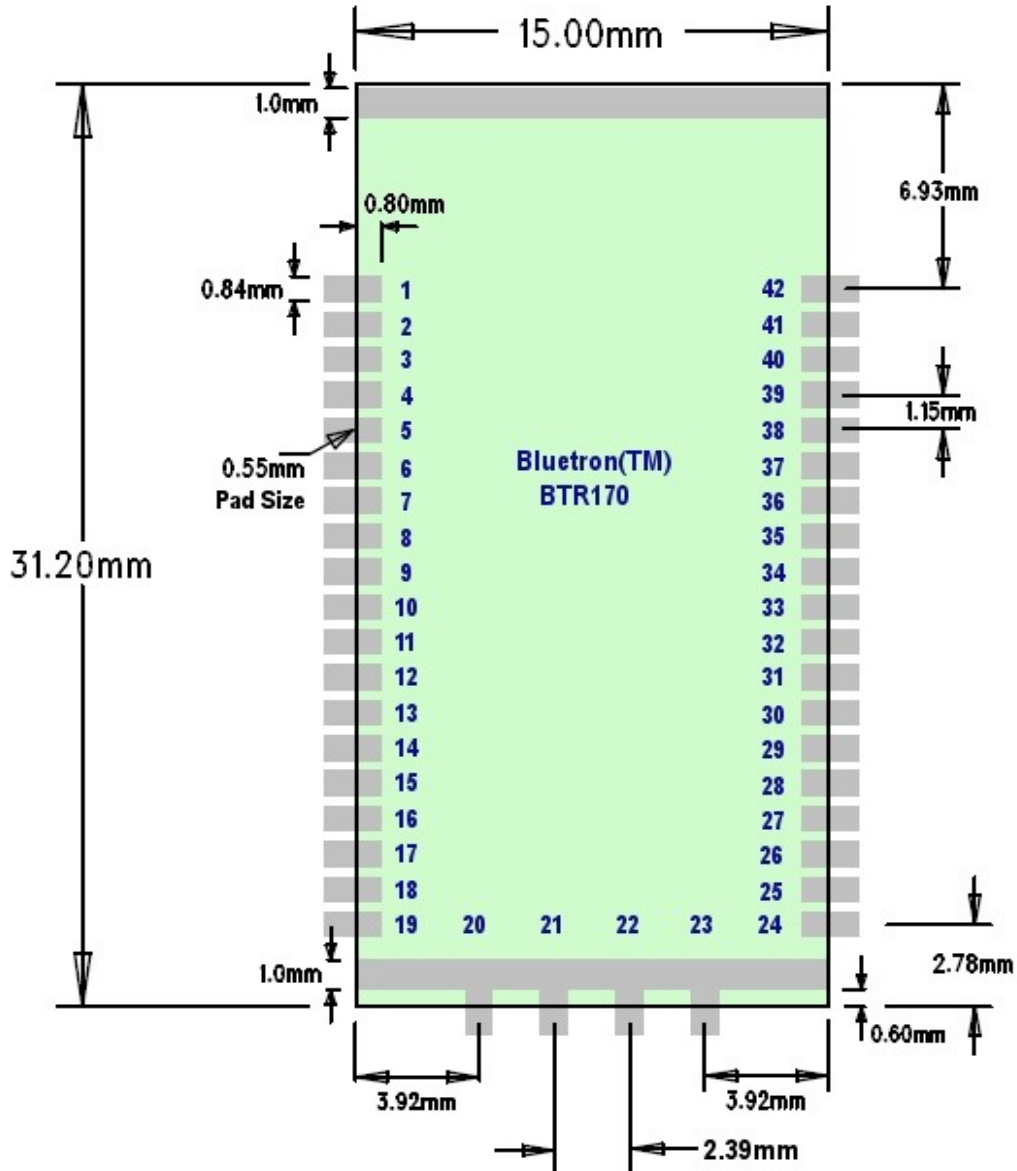
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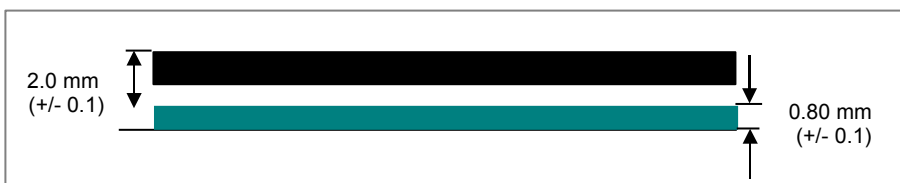
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Mechanical Specification

Top view



Side view



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Pin Assignment

Terminal	Name	Description
1	ANT	50 Ohm antenna port
2	AIO[0]	Programmable input/output line
3	AIO[1]	Programmable input/output line
4	N.C.	N.C.
5	RESET	Active 'HIGH'. Input muse be high for >5ms
6	VPA	positive supply for power amplifier
7	UART_RTS	UART request to send active 'LOW'
8	UART_CTS	UART clear to send active 'LOW'
9	UART_TX	UART data output
10	UART_RX	UART data input
11	SPI_CSB	Chip select for Synchronous Serial Interface active 'LOW'
12	SPI_MOSI	Serial Peripheral Interface data input
13	SPI_MISO	Serial Peripheral Interface data output
14	SPI_CLK	Serial Peripheral Interface clock
15	+1.8V	Positive supply for analog core
16	VDD	Positive supply for memory, PIO and regulator
17	GND	Ground connection
18	PCM_CLK	Synchronous data clock
19	VREG_EN	High or not connected to enable regulator. Vss to disable regulator
20	GND	Ground connection
21	GND	Ground connection
22	GND	Ground connection
23	GND	Ground connection
24	N.C.	Not Connected
25	PCM_OUT	Synchronous data output
26	PCM_IN	Synchronous data input



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27	PCM_SYNC	Synchronous data sync
28	USB_D-	USB data minus
29	USB_D+	USB data plus
30	NC	Not connected
31	NC	Not connected
32	PIO[2]	Programmable input/output line
33	PIO[3]	Programmable input/output line
34	PIO[4]	Programmable input/output line
35	PIO[5]	Programmable input/output line
36	PIO[6]	Programmable input/output line
37	PIO[7]	Programmable input/output line
38	PIO[8]	Programmable input/output line
39	PIO[9]	Programmable input/output line
40	PIO[10]	Programmable input/output line
41	PIO[11]	Programmable input/output line
42	GND	Ground connection

General Specifications

	Minimum	Typical	Maximum
Supply Voltage, VDD (Memory, Regulator, PIO, USB)	3.0V	3.3V	3.6V
Supply Voltage (LO, Radio, Analog, Core)	1.7V	1.8V	1.9V
Operating Temperature range	-20°C	-	70°C
Storage Temperature range	-40°C	-	85°C
Frequency Range	2.4 GHz		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 = 20°C
 Frequency = 2.441GHz

Receiver	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER	-92	-91	-90	≤-70	dBm
Maximum received signal	-20	10	-	≥-20	dBm
Transmitter	Min	Typ	Max	Bluetooth Specification	Unit
Average Output Power	14.5	16	19	0 to 20	dBm
20dB bandwidth	-	755	-	≤ 1000	KHz
2 nd Adjacent Channel Power (F ₀ +/- 2MHz)	-	-32	-	≤ -20	dBm
3 rd Adjacent Channel Power (F ₀ +/- 3MHz)	-	-41	-	≤ -40	dBm
Δf1 avg "Maximum Modulation"	-	168	-	140<Δf1<175	KHz
Δf2 avg "Maximum Modulation"	-	156	-	115	KHz
Δf2avg / Δf1avg	0.87	0.91	0.93	≥0.8	

Power Consumption

Voltage Supplies = 3.3V
 Temperature = 20°C
 Frequency = 2.441GHz

Mode	Average	Peak	Unit
Power Amplifier Power Consumption			
Transmit Mode	101	-	mA
Receive Mode	10	-	mA
Chipset Power Consumption			
Page Scan	0.42	-	mA
Inquiry and page scan	0.76	-	mA
ACL Master with file transfer, 115.2kbps UART	10.3	-	mA
ACL Slave with file transfer, 115.2kbps UART	24.7	-	mA
ACL Master, No traffic, 115.2kbps UART	4.6	-	mA
ACL Slave, No traffic, 115.2kbps UART	17	-	mA
ACL connection, sniff mode 40ms interval, 38.4kbps UART	2.4	-	mA
ACL connection, sniff mode 1.28s interval, 38.4kbps UART	0.37	-	mA
SCO HV1, Master, 38.4kbps UART	39.2	-	mA
SCO HV1, Slave, 38.4kbps UART	39.1	-	mA
SCO HV3, Master, 38.4kbps UART	20.3	-	mA
SCO HV3, Slave, 38.4kbps UART	24.8	-	mA
SCO HV3, sniff mode 30ms interval, Master, 38.4kbps UART	19.8	-	mA
SCO HV3, sniff mode 30ms interval, Slave, 38.4kbps UART	19	-	mA
Parked Slave, 1.28s beacon interval, 38.4kpbs UART	0.2	-	mA
Standby Mode	40	-	μA
Reset	34	-	μA

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Solder Profiles

In order to setup your application, it is required to have the soldering profile which based on various parameters.

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 Balls

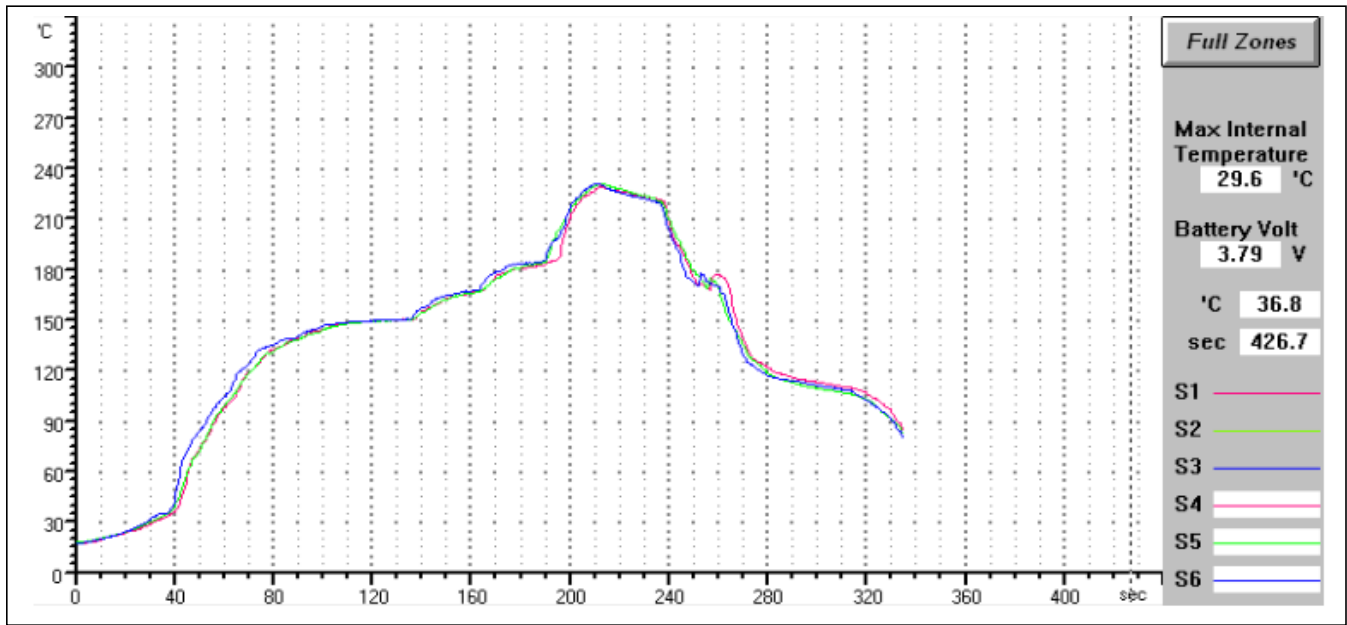


Figure 1.1: Typical Lead-Free Re-flow Solder Profile

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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