

Bluetooth® Audio Modules

BTM510/511 - Firmware Release v22.2.5.0



The BTM510 and BTM511 low-power Bluetooth® modules from Laird are designed for adding robust audio and voice capabilities. Based on the market-leading Cambridge Silicon Radio BC05 chipset, these modules provide exceptionally low power consumption with outstanding range. Supporting the latest Bluetooth Version v3.0 specification, these modules provide the important advantage of Simple Secure Pairing that improves security and enhances easy use. BTM510 and BTM511 modules come standard with the apt-X™ audio codec for wireline-quality stereo audio.

The modules' compact size makes them ideal for battery-powered headset form factor audio and voice devices. With a 16-bit stereo codec and microphone inputs to support stereo and mono applications, the modules contain a fully integrated Bluetooth-qualified stack along with SPP, HFP 1.6, HSP, AVRCP v1.5, and A2DP profiles.

The BTM510/511 modules include an embedded 32-bit, 64-MIPS DSP core within the BC05. This allows designers to make use of features such as echo cancellation and noise reduction using CSR Clear Voice Capture (CVC) as well as A2DP audio enhancements using CSR Music Manager.

BTM510 and BTM511 modules are provided with CSR's apt-X codec without additional license fees. CSR's world renowned apt-X™ audio compression solutions retain the full integrity of original digital audio and are optimized for instant real-time audio streaming (http://www.csr.com/products/technology/aptx).

To speed product development and integration, Laird has developed a comprehensive AT command interface that simplifies application development, including support for audio and headset functionality. Combined with a low-cost development kit, Laird's Bluetooth modules provide faster time to market.

Features and Benefits (3) TROHS

- Fully featured Bluetooth multimedia chipset
- Bluetooth v3.0
- Supports mono / stereo headset applications
- apt-X Audio Codec provided free of charge
- Adaptive frequency hopping to cope with interference from other wireless devices
- 32-bit Kalimba DSP for enhanced audio applications
- Support for secure simple pairing
- External or internal antenna options
- HSP and A2DP audio profiles
- HFP v1.6 Wideband Speech and AVRCPv1.5
- 16-bit stereo codec and microphone input
- AptX, AAC and SBC codecs supported
- CVC 7th gen. audio enhancement supported
- EIR fully supported
- Integrated audio amplifiers for driving stereo speaker
- Comprehensive AT interface for simple programming
- Bluetooth End Product qualified
- Compact size
- Class 2 output 4 dBm
- Low power operation
- WLAN co-existence hardware support

Application Areas

- High-quality stereo headsets
- Mono voice headsets
- Hands-free devices
- Wireless audio cable replacement
- MP3 and music players
- Phone accessories
- VoIP products
- Cordless headsets
- Aftermarket automotive applications

global solutions: local support

USA: +1.800.492.2320 Europe: +44.1628.858.940 Asia: +852.2268.6567

wirelessinfo@lairdtech.com www.lairdtech.com/wireless



Bluetooth® Audio Modules

BTM510/511 - Firmware Release v22.2.5.0

Supply Voltage Supply 3.0 V to +3.6 V DC	CATEGORIES	Feature	IMPLEMENTATION		
Wireless Specification Receive Sensitivity Receive Sensitivity Range Data Rates Up to 30 meters Data Rates Up to 3 Mbps (over the air) UART Data Transfer Rate Host Interface Wireless Specification Wireless Specification Audio Interface Audio Interfaces Data Rates Up to 3 Mbps (over the air) UART Data Transfer Rate Up to 3 Mbps (over the air) UART Supports DTR, DSR, DCD and RI, multiplexed with other functionality Internal 16-bit Stereo Codec Integrated Amplifiers for driving stereo speaker Microphone Stereo microphone input Stereo microphone input DSP Additional I/O 4 x GPIO Function Mapping e.g. button control SPP (Serial Port Profile), HSP, HFP v1.6 (Audio Gateway and Handset), A2D (Source and Sink), AVRCP v1.5 (Target and Controller) Supply Voltage Vi/O 1.7 v to +3.6 v DC Operational - Less than 70 mA (including speaker amplifiers) Idle (sleep) < 1.0 mA Configurable Sniff mode and Sniff sub rating Coexistence 802.11 (WLAN) 2 wire and 3 wire schemes supported Connections External Antenna Internal Antenna Multilayer ceramic – BTM510 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (SMT connector – BTM511) Proyronmental Operating Temperature Operating Temperature -40° C to +85° C Storage Temperature -40° C to +85° C Storage Temperature Lead Free		Bluetooth®	Version 3.0		
Wireless Specification Receive Sensitivity Receive Supports OTR. D30 meters Up to 3 Mbps (over the air) Up to 4 Mbps (Frequency	2.402 – 2.480 GHz		
A dBm (from integrated antenna – BTMS11)		May Transmit Dawer	Class 2 - 4 dBm (at antenna pad – BTM510)		
Range	Wireless Specification	Max Transmit Power			
Data Rates Up to 3 Mbps (over the air)		Receive Sensitivity	Better than -86 dBm		
Host Interface UART Data Transfer Rate Supports DTR, DSR, DCD and RI, multiplexed with other functionality Interfaces Audio Interfaces A		Range	Up to 30 meters		
Host Interface UART Supports DTR, DSR, DCD and RI, multiplexed with other functionality Audio Interfaces Codec Internal 16-bit Stereo Codec Integrated Amplifiers for driving stereo speaker DSP Marcophone Stereo microphone input DSP Integrated Kalimba DSP 32-bit, 64 MIPS Additional I/O 4 x GPIO Function Mapping e.g. button control Profiles SPP (Serial Port Profile), HSP, HFP v1.6 (Audio Gateway and Handset), A2D (Source and Sink), AVRCP v1.5 (Target and Controller) Supply Voltage Supply 3.0 V to +3.6 V DC Power Consumption Current Consumption Idle (sleep) < 1.0 mA		Data Rates	Up to 3 Mbps (over the air)		
Audio Interfaces Codec Internal 16-bit Stereo Codec Integrated Amplifiers for driving stereo speaker DSP Microphone Stereo microphone input DSP Integrated Kalimba DSP 32-bit, 64 MIPS Additional I/O 4 x GPIO Function Mapping e.g. button control Profiles SPP (Serial Port Profile), HSP, HFP v1.6 (Audio Gateway and Handset), A2D (Source and Sink), AVRCP v1.5 (Target and Controller) Supply Voltage Supply 3.0 V to +3.6 V DC Power Consumption Current Consumption Idle (sleep) < 1.0 mA (including speaker amplifiers)		UART Data Transfer Rate	Greater than 300 Kbps		
Audio Interfaces Codec Integrated Amplifiers for driving stereo speaker	Host Interface	UART	Supports DTR, DSR, DCD and RI, multiplexed with other functionality		
Audio Interfaces		Codec	Internal 16-bit Stereo Codec		
IZS / PCM Master / slave roles	A -1' - 1 - 1 - 2C		Integrated Amplifiers for driving stereo speaker		
DSP Integrated Kalimba DSP 32-bit, 64 MIPS Additional I/O 4 x GPIO Function Mapping e.g. button control SPP (Serial Port Profile), HSP, HFP v1.6 (Audio Gateway and Handset), A2D (Source and Sink), AVRCP v1.5 (Target and Controller) Supply Voltage Supply 3.0 V to +3.6 V DC I/O 1.7 V to +3.6 V DC Operational - Less than 70 mA (including speaker amplifiers) Idle (sleep) < 1.0 mA Configurable Sniff mode and Sniff sub rating Coexistence 802.11 (WLAN) 2 wire and 3 wire schemes supported Connections Internal Antenna Connection via SMT pad – BTM510 Programming API AT Command Set (extended for audio and headset functions) 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Environmental Storage Temperature -40° C to +85° C Lead-free and RoHS compliant	Audio interfaces	I2S / PCM	Master / slave roles		
Additional I/O Profiles SPP (Serial Port Profile), HSP, HFP v1.6 (Audio Gateway and Handset), A2D (Source and Sink), AVRCP v1.5 (Target and Controller) Supply Voltage Supply 3.0 V to +3.6 V DC I/O 1.7 V to +3.6 V DC Operational - Less than 70 mA (including speaker amplifiers) Idle (sleep) < 1.0 mA Configurable Sniff mode and Sniff sub rating Coexistence 802.11 (WLAN) 2 wire and 3 wire schemes supported Connections External Antenna Connection via SMT pad – BTM510 Internal Antenna Multilayer ceramic – BTM511 Programming API Physical Dimensions AT Command Set (extended for audio and headset functions) 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) 2 wire and 3 wire schemes supported Connection via SMT pad – BTM510 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Environmental Operating Temperature Storage Temperature Lead-free and RoHS compliant			Stereo microphone input		
Profiles SPP (Serial Port Profile), HSP, HFP v1.6 (Audio Gateway and Handset), A2D (Source and Sink), AVRCP v1.5 (Target and Controller) Supply Voltage Supply 3.0 V to +3.6 V DC I/O 1.7 V to +3.6 V DC Operational - Less than 70 mA (including speaker amplifiers) Idle (sleep) < 1.0 mA Configurable Sniff mode and Sniff sub rating Coexistence 802.11 (WLAN) 2 wire and 3 wire schemes supported Connections External Antenna Connection via SMT pad – BTM510 Internal Antenna Multilayer ceramic – BTM511 Programming API AT Command Set (extended for audio and headset functions) 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Operating Temperature -40° C to +85° C Storage Temperature -40° C to +85° C	DSP	Integrated Kalimba DSP	32-bit, 64 MIPS		
Supply Voltage Supply 3.0 V to +3.6 V DC	Additional I/O	4 x GPIO	Function Mapping e.g. button control		
Supply Voltage Supply 3.0 V to +3.6 V DC	Drofiles		SPP (Serial Port Profile), HSP, HFP v1.6 (Audio Gateway and Handset), A2DP		
To To To To To To To To	Profiles		(Source and Sink), AVRCP v1.5 (Target and Controller)		
Power Consumption Current Consumption Current Consumption Coexistence B02.11 (WLAN) Configurable Sniff mode and Sniff sub rating Coexistence External Antenna Connections Connections Connections Connections Connection via SMT pad – BTM510 Internal Antenna Multilayer ceramic – BTM511 AT Command Set (extended for audio and headset functions) 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Coperating Temperature Storage Temperature Lead-free and RoHS compliant	Supply Voltage	Supply	3.0 V to +3.6 V DC		
Power Consumption Current Consumption Idle (sleep) < 1.0 mA Configurable Sniff mode and Sniff sub rating 2 wire and 3 wire schemes supported Connections External Antenna Internal Antenna Connection via SMT pad – BTM510 Internal Antenna Multilayer ceramic – BTM511 Programming API AT Command Set (extended for audio and headset functions) 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Coperating Temperature Storage Temperature -40° C to +85° C Lead-free and RoHS compliant		I/O	1.7 V to +3.6 V DC		
Coexistence 802.11 (WLAN) 2 wire and 3 wire schemes supported Connections External Antenna Connection via SMT pad – BTM510 Internal Antenna Multilayer ceramic – BTM511 Programming API AT Command Set (extended for audio and headset functions) Physical Dimensions 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Environmental Operating Temperature -40° C to +85° C Storage Temperature -40° C to +85° C	Power Consumption		Operational - Less than 70 mA (including speaker amplifiers)		
Coexistence 802.11 (WLAN) 2 wire and 3 wire schemes supported Connections External Antenna Connection via SMT pad – BTM510 Internal Antenna Multilayer ceramic – BTM511 Programming API AT Command Set (extended for audio and headset functions) Physical Dimensions 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) 40° C to +85° C Environmental Operating Temperature -40° C to +85° C Storage Temperature -40° C to +85° C Lead-free Lead-free and RoHS compliant		Current Consumption	Idle (sleep) < 1.0 mA		
Connections External Antenna Connection via SMT pad – BTM510 Internal Antenna Multilayer ceramic – BTM511 Programming API AT Command Set (extended for audio and headset functions) Physical Dimensions 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Environmental Operating Temperature -40° C to +85° C Storage Temperature -40° C to +85° C					
Internal Antenna Multilayer ceramic – BTM511	Coexistence	802.11 (WLAN)			
Programming API AT Command Set (extended for audio and headset functions) 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Environmental Operating Temperature Storage Temperature Lead-free and RoHS compliant	Connections	External Antenna	Connection via SMT pad – BTM510		
Physical Dimensions 14 mm x 20 mm x 3.4 mm (SMT connector – BTM510) 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Environmental Operating Temperature -40° C to +85° C Storage Temperature -40° C to +85° C Lead-free and RoHS compliant		Internal Antenna	Multilayer ceramic – BTM511		
Physical Dimensions 14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511) Environmental Operating Temperature -40° C to +85° C Storage Temperature -40° C to +85° C Lead-free and RoHS compliant	Programming API		AT Command Set (extended for audio and headset functions)		
Environmental Operating Temperature Storage Temperature Lead-free and RoHS compliant	Physical	Dimensions	14 mm x 20 mm x 3.4 mm (SMT connector – BTM510)		
Storage Temperature -40° C to +85° C			14 mm x 25 mm x 3.4 mm (integrated antenna – BTM511)		
Storage Temperature -40° C to +85° C	Environmental	Operating Temperature	-40° C to +85° C		
Lead Free Lead-free and RoHS compliant		Storage Temperature	-40° C to +85° C		
Miscellaneous	Miscellaneous	Lead Free	Lead-free and RoHS compliant		
Warranty 1-Year Warranty		<u> </u>	,		
Developmental Tools Development Kit Development board and software tools	Developmental Tools	Development Kit	Development board and software tools		
Bluetooth End Product Approved		Bluetooth	End Product Approved		
Approvals BTM510 - Limited Modular Approval	Approvals	FCC/IC/CE & MIC	BTM510 - Limited Modular Approval		
BTM511 - Full Modular Approval			BTM511 - Full Modular Approval		

Ordering Information **3** ✓ RoHS

BTM510-09	Bluetooth Multimedia Module (external antenna)
BTM511-09	Bluetooth Multimedia Module (with internal antenna)
DVK-BTM510	Development Kit (external antenna)
DVK-BTM511	Development Kit (with internal antenna)

The details contained within the document are subject to change. Download the product specification from www.lairdtech.com/wireless for the most current specification.

CONN-DS-BTm510/511 FW v22.2.5.0

Any information furnished by Laird Technologies, Inc. and its agents is believed to be accurate and reliable. All specifications are subject to change without notice. Responsibility for the use and application of Laird Technologies materials rests with the end user. Laird Technologies makes no warranties as to the fitness, merchantability, suitability or non-infringement of any Laird Technologies materials or products for any specific or general uses. Laird Technologies shall not be liable for incidental or consequential damages of any kind. All Laird Technologies products are sold pursuant to the Laird Technologies' Terms and Conditions of sale in effect from time to time, a copy of which will be furnished upon request. © Copyright 2013 Laird Technologies, Inc. All Rights Reserved. Laird, Laird Technologies, the Laird Technologies, odd, and other marks are trademarks or registered trademarks of Laird Technologies, Inc. or an affiliate company thereof. Other product or service names may be the property of third parties. Nothing herein provides a license under any Laird Technologies or any third party intellectual property rights.

Revision History

I C VISIOII	1 113001 y		
Ver	Date	Changes	Approved By
1.0	16 Jun 2013	Initial	J. Kaye

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Laird Connectivity:

BTM510 BTM511 DVK-BTM510 DVK-BTM511